AMERICAN FORESTS

APRIL 1939

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SPECIAL FIRE PREVENTION NUMBER

AMERICAN FORESTS

EDITOR—Ovid Butler

ASSOCIATE EDITORS—
Lilian Cromelin and Erle Kauffman

April, 1939

VOLUME 45 NUMBER 4

Published Monthly by
THE AMERICAN FORESTRY ASSOCIATION
919 Seventeenth Street, Washington, D. C.
35c A COPY, $4.00 A YEAR

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FOREST CONSERVATION

We believe our natural resources of soil, water, forests and wildlife are basic to the welfare of the Nation, and that their protection and wise use must be assured.

To this end we, the undersigned, are striving to do our part to protect the forest resources of the Nation, but we believe that prevention and suppression of forest fires is a public responsibility which must be equitably met by the State and Federal Governments.

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"The first is more adequate *protection* of forests from fire, insects, and diseases; the second, the creation and promotion of better and new *markets* for lumber and forest products."

This summary of essentials of a National Forestry Program, presented before the 38th Annual Meeting of the Society of American Foresters, December, 1938, by G. H. Collingwood, Forester of The American Forestry Association, hits the "nail on the head." Other actions are needed to advance Forestry in this country, but none others are so important as these.

By protecting the forests we assure continued growth to meet the nation's timber requirements; by providing markets, both domestic and foreign, we encourage forest management as a self-supporting enterprise and as a way to permanent industry and to dependable sources of employment. For these two there is no substitute. Without them no "solution" will solve our American Forest Problem.

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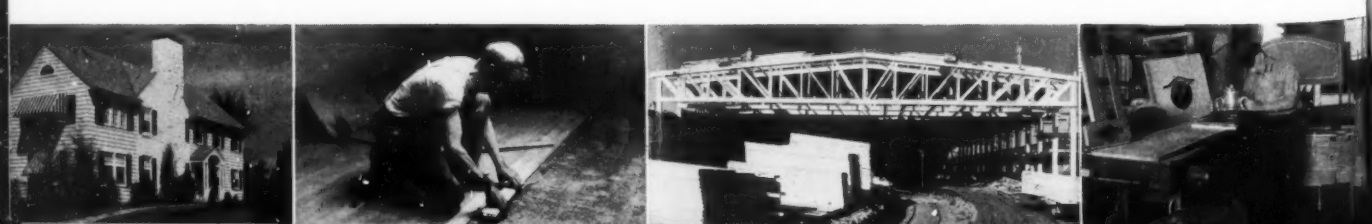

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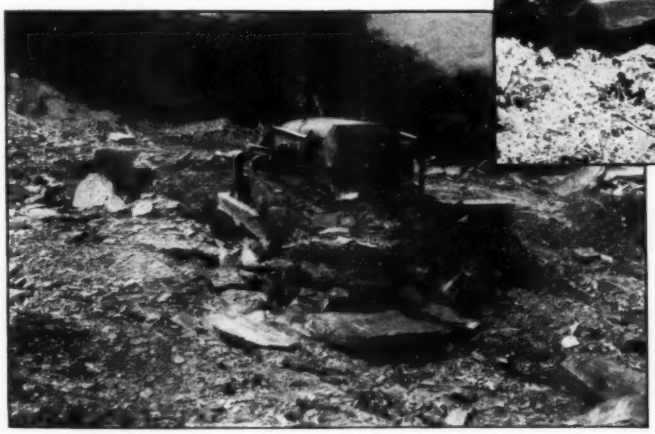

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PRESIDENT ROOSEVELT URGES GREATER PUBLIC SUPPORT OF FOREST FIRE PREVENTION

THE WHITE HOUSE
WASHINGTON

January 20, 1939

My dear Mr. Butler:

The necessity of concerted action to prevent forest fires and by that means preserve one of our most valuable national assets should be urged at all times and cannot be overemphasized. The magnitude of the problem is indicated in figures furnished me by the Department of Agriculture which show that in 1937 alone there were more than one hundred seventy-five thousand fires on state and privately owned forest lands and farm woodlands. The area burned, according to departmental reports, was greater than the land surface in six New England states combined.

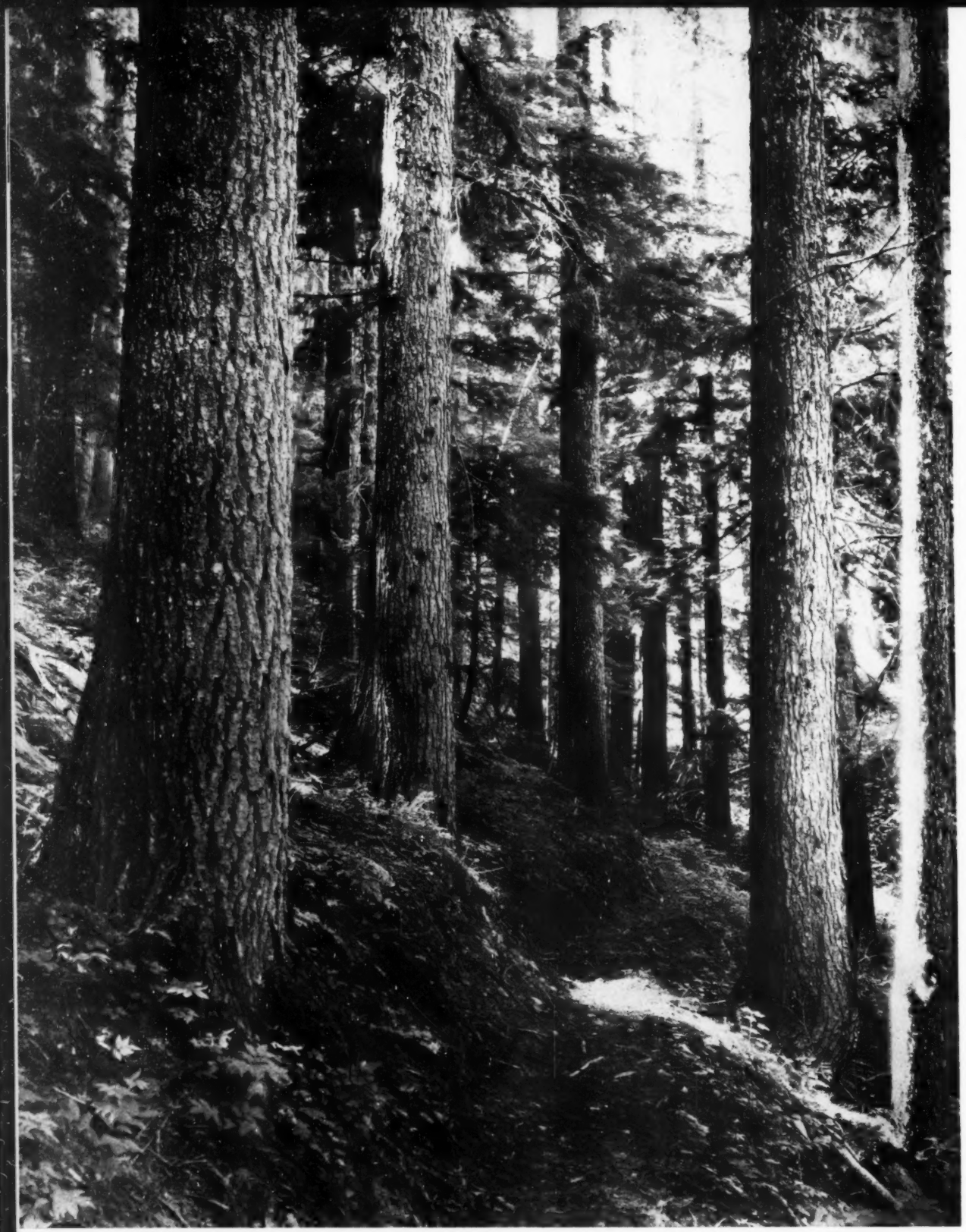
Lightning started some of these fires but many more were caused by the carelessness of man. This is a serious situation. It is evident that much greater care with fire is needed. So is wider application of more adequate forest fire control. I am, therefore, in hearty sympathy with the efforts of The American Forestry Association in these directions. I hope the forthcoming April issue of American Forests will help focus attention on the work of prevention and protection which is so essential. With public understanding and support I am convinced this phase of our forest problem can be solved in such a way that forest lands will increase the wealth of the nation and bring greater stability, security and prosperity to dependent families and communities.

Very sincerely yours,

Franklin D. Roosevelt

Mr. Ovid Butler,
Editor, American Forests,
919 Seventeenth Street, N. W.
Washington, D. C.

From the painting "Forest Fire," by Demishoff Uralsky



What Nature creates from tiny seeds sown two centuries ago, forest fires sown by man's carelessness may destroy in a few hours. A 200-year-old forest in Idaho

FOREST FIRE--

THE RED PARADOX

OF CONSERVATION

Forest fire writes its red paradox across conservation's page 172,000 times every year

By W. B. GREELEY

Secretary-Manager, West Coast Lumbermen's Association

ON AUGUST 14, 1933, in an upper reach of Gales Creek, Tillamook County, Oregon, two logs rubbed together. One was a Douglas fir, on its way to the landing. The other was a cedar windfall, tinder dry. A high wind was blowing from the northeast. Sparks popped from the friction of the two logs into dry logging debris, and the wind fanned them into small tongues of flame. Smoke spiraled upward.

Like all major disasters, the Tillamook fire seemed to be managed by some malignant power of fate. It started at noontime. The operation was closing down because of fire danger. Conditions were plainly bad. The fire spread with explosive force, despite the efforts of loggers and other experienced fire fighters; and before nightfall it had covered 400 acres. The area was very rough and lacked trails. By nightfall of the second day the fire had spread over about ten sections. There it was held until August 20, when the wind again blew hard from the east and the humidity fell. The fire marched westward, spreading over 40,000 acres. On August 25 the fire blew up. Within forty hours, from midnight of August 24 until the evening of August 26, a tornado of flame swept twenty miles to the west and ten miles to the south. It brought smoky night to the region, and carried clouds of ashes to the sea.

The area burned in the Tillamook fire was 244,706 acres. The volume of timber killed was 10,257,517,000 board feet, nearly three times the West Coast cut in 1933. This was one of Oregon's finest timber stands. Six years of direct employment for 14,000 men and a loss in lumber values alone of $275,000,000 went up in smoke. The burned timber would have built one million small homes.

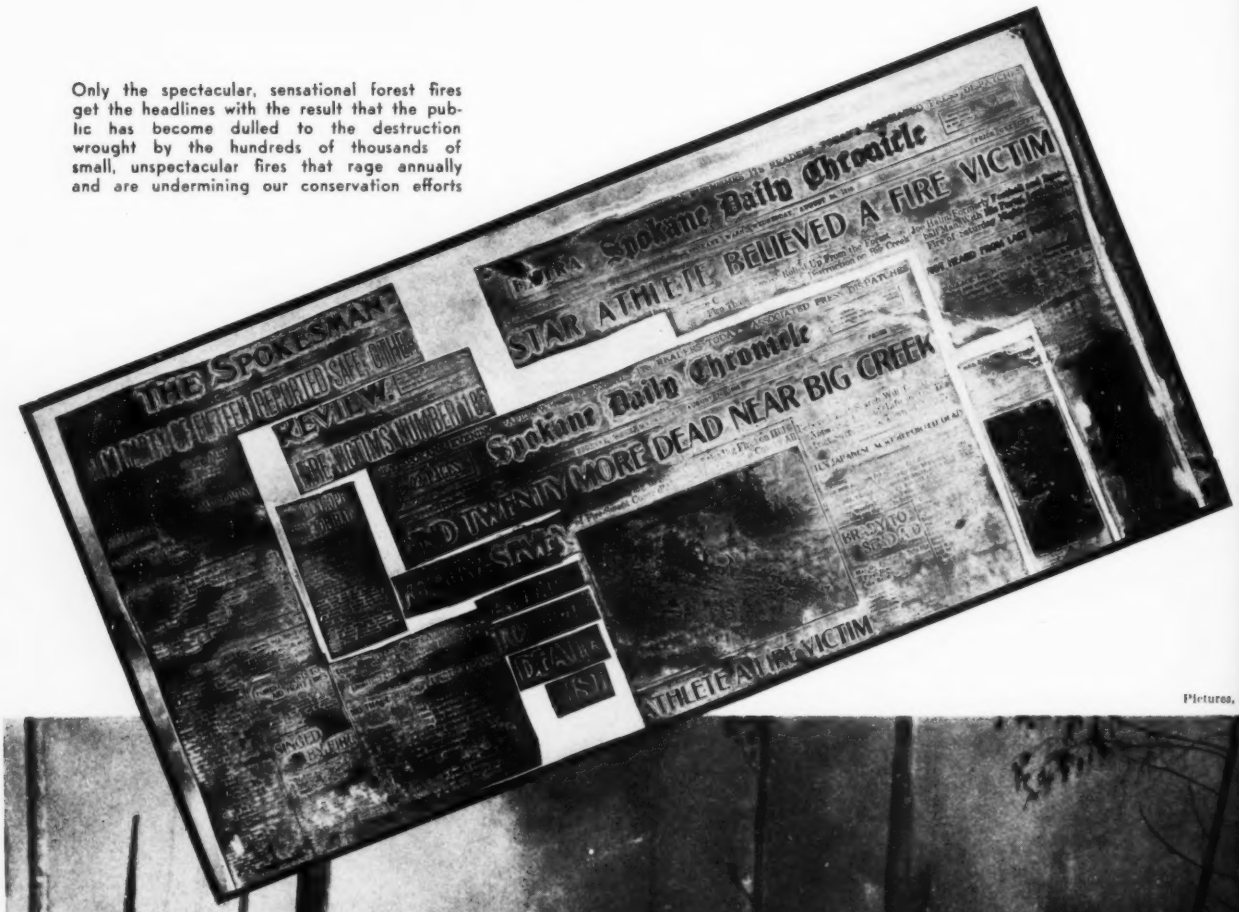
The Tillamook burn, although some timber has been salvaged and much of the area is reforesting, remains a monumental testament to the red paradox of the American conservation movement. After forty years of conservation, we must admit defeat at the hands of conservation's chief enemy—the forest fire. This is a harsh statement, in view of all the splendid progress in organized fire prevention, public and private. But the hard facts speak for themselves.

The tragedy of Peshtigo should have been enough to make forest fire control the first objective of the conservation movement. The Peshtigo fire started from slash in the clearing for a railroad right-of-way, in the fall of 1871. On Sunday, October 8, a million acres of Wisconsin pines were burned. A tidal wave of fire struck the lumber town of Peshtigo. Fifteen hundred men, women and children perished. It was the time of the great Chicago fire, in which the loss of life was less than a fifth of Peshtigo's fire deaths. On September 11, 1894, the pineries in the Hinckley, Minnesota area burned, and 413 lives were lost. Each year, on past the turn of the century, forest fires took human life. In the Idaho-Montana fires of 1910, seventy-four died. Cloquet, Minnesota burned on October 12, 1918, with a loss of seven lives. The Blackwater Canyon fire in Montana, August, 1937, left fifteen charred bodies in its smoldering wake.

In 1938, southern California fires, started by the careless dumping of hot coals from a kitchen stove, raged through brush and scrub timber, destroying million of dollars' worth of residential property.

The spectacular forest fire disasters of the past seventy years are a terrible record of loss of human life, and of destruction of mature timber, timber crops, improved property and communities. However, the

Only the spectacular, sensational forest fires get the headlines with the result that the public has become dulled to the destruction wrought by the hundreds of thousands of small, unspectacular fires that rage annually and are undermining our conservation efforts


Spokane Daily Chronicle
STAR ATHLETE BELIEVED A FIRE VICTIM
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TWENTY MORE DEAD NEAR BIG CREEK
ATHLETE A FIRE VICTIM

Pictures, Inc.

The attempt to teach the public forest protection in terms of a circus of horrors might well be abandoned, the author believes

Courtesy Life Magazine

"The root of the problem is public indifference. There is no public will to prevent forest fires."

most discouraging side of the forest fire picture is not in spectacular disasters which are publicized on the front pages of the newspapers for a brief period and then forgotten. The red blot on conservation is the annual tens of thousands of typical forest fires which get comparatively little attention, especially those in young growing forests which the public has not been taught to appreciate. These fires represent the conservation movement's most inexcusable failure, because they are generally subject to control.

The forest fire statistics of the federal Forest Service for 1937 provide substantial evidence. The year 1937 was a "good" forest fire year, on the basis of five-year averages. It yielded *only* 185,000 forest fires in the United States, Alaska excluded. They burned over *only* 22,000,000 acres of land, or but a little more than half the acreage burned in 1936. More than eleven per cent of the total unprotected forest area of the country was burned over; and ninety-four per cent of all acreage burned over was *unprotected* forest land. The bill of damages on the 1937 unprotected acreage burned is stated by the Forest Service as $18,202,740.

Viewing the situation over a term of years, the record shows that during the five-year period, 1933 to 1937, the number of forest fires which occurred in the United States, Alaska excluded, averaged just short of 172,000 a year, and that the average acreage burned amounted to 36,327,754 acres with total yearly damage of approximately $43,000,000.

In the *protected* forest area of the United States, the Service reports an annual average of 66,752 forest fires, of which 4,175 were started by campers; 16,282 by smokers; 16,487 by incendiarists; 9,126 from debris burning; 5,813 by lightning; 1,207 from lumbering. The latter caused two per cent of the total fires; while campers, smokers and arsonists caused fifty-five per cent; lightning, nine per cent; and debris burning, or land clearing, fourteen per cent. Railroad fires, a little more than four per cent of the total, and fires of miscellaneous and unknown causes make up the remainder.

In 1937 and again in 1938 140,000,000 trees were planted on 155,000 acres of national forests; more than 150,000 acres planted—but the annual fire loss is 287,000 acres on those forests.

FOREST FIRES BURN OVER 36,000,000 ACRES EVERY YEAR- A LAND AREA EQUAL TO THE STATE OF IOWA, OR ALL OF NEW ENGLAND WITH THE EXCEPTION OF CONNECTICUT

What does it profit conservation to plant new timber crops while failing to control fires that burn an area a third larger than that planted?

In the State of Washington in 1938, according to the state forester, 2,197 forest fires burned over 116,000 acres. In the same year, in the state's western lumber region 80,000 acres were cut over. The forest industry of western Washington spent more than $800,000 for fire control and the production of new timber crops in the year 1937. The 1938 record shows the effect of that expenditure. Of the state's 2,197 fires, only fifty-seven originated in lumbering operations, or less than three per cent. There were 772 smokers' fires; 148 campers' fires.

What does it profit conservation, when made an active force within the forest industry, to expend hundreds of thousands of dollars for the growing and protection of new timber, while forest-fire prevention outside the industry fails?

The lesson of all these statistics is that the forest fire problem is a public problem. Solution of the fire problem should be the first order of business for the conservation movement. Putting these two points together, it logically follows that *the big job of conservation today is in the field of public responsibility for forest fires.* Forest industry, in at least much of the country, is doing more than its part in forest-fire prevention. The Forest Service and State forestry departments are doing a wonderful job of fire protection on lands under their jurisdictions. The great failure lies on the public side, with the campers, the smokers and the land clearers, and with law enforcement agencies that have failed to halt the incendiarist in the forest.

The root of the problem is public indifference and ignorance. *There is no public will to prevent forest fires,* as there is, for example, to preserve wildlife, because the public has not been educated in the realities of fire control.

Education of the public in forest-fire responsibility and control has been pushed hard on the West Coast, yet it is notoriously true in this region that a "stump rancher" may be jailed three months for shooting a deer out of season to feed his family, and yet be fined no more than five dollars, if at all, for burning debris on his land without a permit, in violation of the law, and often with the destruction of adjacent growing timber. The smoker or the camper who starts a forest fire, seldom suffers more than inconvenience *if* he is caught by law officers. Of the State of Washington's 2,197 forest fires in 1938, 436 were incendiary fires. To date not one of the criminals responsible for those fires has been brought to book. Smokers and campers who start fires are also violators, for if they obey the regulation, they do not start fires.

Public opinion must be aroused in behalf of fire control before there can be better enforcement of fire protection laws. At present public opinion is passive to the vast majority of forest fires, and may be excited —and then only temporarily—by spectacular forest disasters. As human psychology goes in other fields, it is reasonable to presume that the spectacular side of forest fire devastation has been so played up that the public is dulled to the destruction wrought by the hundreds of thousands of unspectacular surface fires.

The attempt to teach the public fire protection in terms of a circus of horrors might well be abandoned. It hasn't worked, according to the factual evidence. The net result has been to create in the public mind a picture of the only real forest fire as an inferno amid giant trees, and to shut out the common picture

Solution of the problem of undramatic surface fires, which are largely man-caused, rests almost solely, the author declares, with the public to prevent

What Price This Crop?

of the surface fires spreading undramatically through growing crops of timber. The proof of this effect is in the familiar fact that the average visitor to the forest will take great precautions with fire in virgin timber, where fire danger is lowest, and take few if any precautions in cutover or in second growth, where it is highest.

Two reports, each written for a radio broadcast, on the Toandas fire of last year on the Olympic Peninsula, now lie before me. One reads:

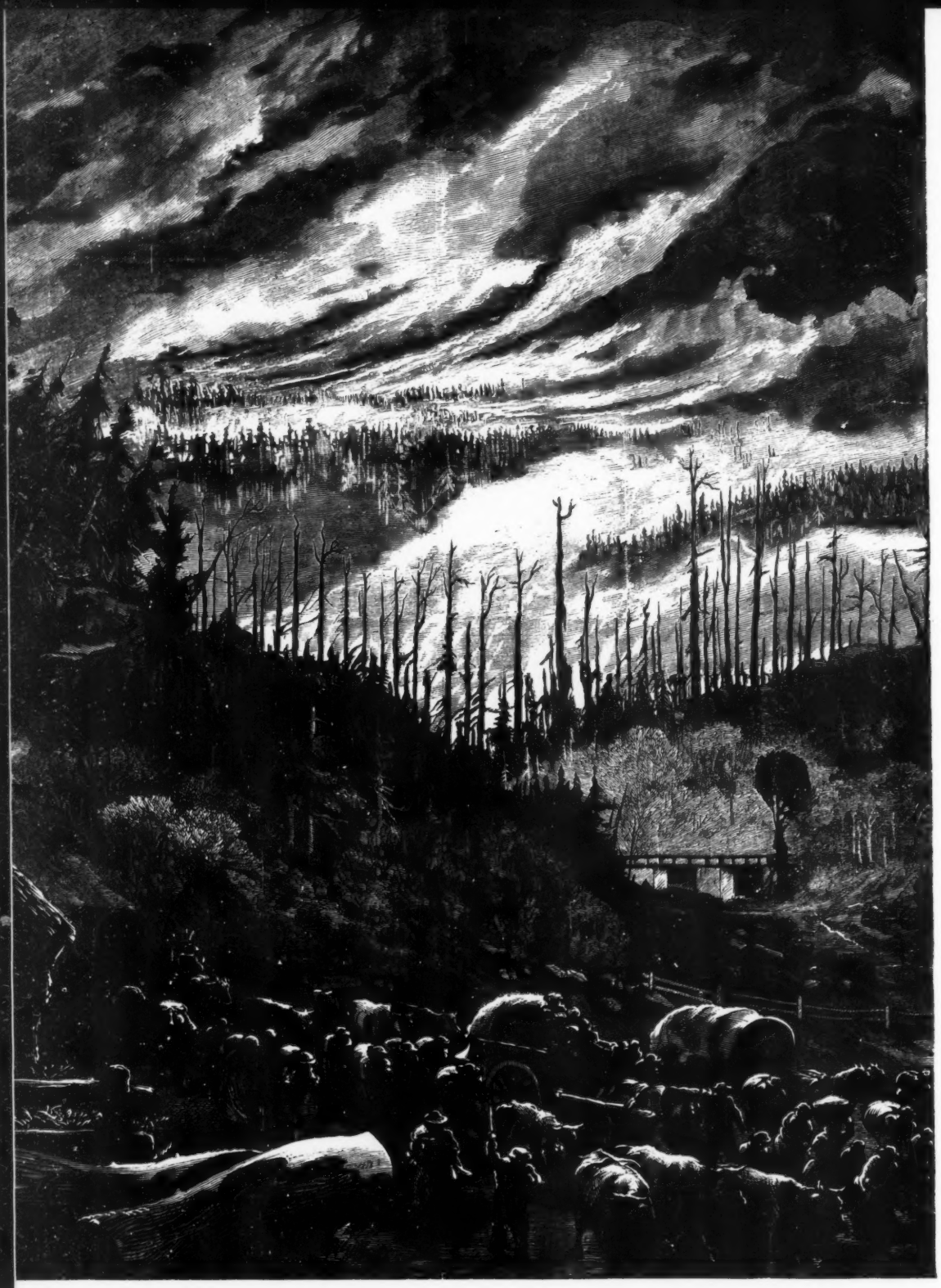
> "There are about 5,200 acres in this fire. It is about eight miles long and a mile wide. The entire area has been cut over at least once, some of it as early as 1870. About half has been recently logged or relogged for poles, piling, shingle bolts and other small material. The areas of oldest cutting contain very fine stands of second growth. This second growth meant future wages, future homes, future business, and future cargoes for the steamship lines and the railroads of the Pacific Northwest."

This was written by a forest engineer. There is material in it for sober education. But note what was done with it for the broadcast, in the conventional way of publicizing forest fires:

> "Looked at from the air, it just seems as if some terribly horrible demon or gigantic fire moth was busy at the blanket of forest that lies underneath. It's one of the most needlessly destructive things from a scenic point of view that human ingenuity could conceive of. It turns a country that has all the green lovely lusciousness of a wilderness forest into what is nothing short of a terrible desert, a charnal house that is filled with a giant jackstraw of blackened timbers lying askew, twisted, torn, broken. . . ."

And so on. Somewhat in this fashion forest-fire facts are commonly turned into sensation, a thrill for the public. A possibly better method would be that which has had long trial with Department of Agriculture bulletins for farmers. These have worked. Circus publicity education of the public on forest fires has not worked. Why should not all of us in the conservation movement get together in creating a series of bulletins on forest fires for national distribution? A series which would be accepted everywhere as authoritative material because all agencies have joined in publishing it?

Timber is a crop. One-fourth of the land area of the United States is fit only for the growing of timber. To keep this part of our land productive in the only crop it is fit to grow, it is vitally necessary to provide real fire control. Fire is the enemy of the young forest, of growing timber, just as the boll weevil is the enemy of cotton, just as the corn-borer is the enemy of corn, and as drouth is the enemy of all farm crops. Science may solve the problems of the boll-weevil and the corn-borer. Drouths must be left to Providence. The solution of the forest fires problem rests almost solely with the public.



This rare old cut of the tragic Peshtigo fire in Wisconsin appeared in Harper's Weekly for December 2, 1871, two months after the most calamitous forest fire in American history had swept over 1,280,000 acres, claiming 1,500 lives. In a brief article accompanying this sketch it was stated: "This was no ordinary fire; almost instantaneously there seemed to be a perfect rain of fire, from which escape was almost impossible, the sparks falling thick and fast as drifting snow . . . ."

WHEN PESHTIGO BURNED

By STEWART H. HOLBROOK

I ONCE worked in a logging camp where the scaler was John Cameron, an ancient man who had known more than fifty years in the timber. Old John had seen a good deal in his time. His face and neck were tanned and wrinkled by the sun and by winds that had blown on him all the way from Maine to Puget Sound. He wore a beard like General Grant's and looked remarkably like the pictures of that gentleman.

But the remarkable thing about John Cameron was the fact that he had lived through the most terrible forest fire this country has ever known. John could tell of fires in Maine and fires in Idaho but I liked best to sit on a deacon seat in the bunkhouse and hear of what went on in Wisconsin in 1871. I have never forgotten the story.

It was in the town of Peshtigo on this particular October morning that John Cameron sniffed the air and looked out across the log pond to the far shore of the river. He said briefly that he had never seen "nothing like it." His eyes were streaked with red, and so were the eyes of every man, woman and child in the village. There was smoke in the air, just as there had been every day for three months past. It came from the slashing fires of crews who were building the North Western railroad.

Even the sun was red-eyed. This morning it had risen late over the Wisconsin timber and it was so deep a red that a man could look it fair in the face without squinting.

No, sir, the grizzled man said again to two lads working on the pond, he certainly had never seen nothing like it. "If we get to snow-fly without no bad trouble," he said, "it will be a wonder." The two lads agreed that things were pretty dry, but they didn't know they had heard a prophet speaking. They continued to pole logs to the mill, where the drone of the saw told of boards being made for the rising young city of Chicago, down at the other end of the lake.

This day when the sun shone so dimly over the north Wisconsin woods was Sunday, October 8, 1871. The village of Peshtigo lay baked and sultry in an autumn heat such as no man, red or white, could recall. The air was deathly still. A man who never could forget that day said long afterward that not a crow, not a bird of any kind was heard to call.

By noon the sun disappeared entirely, and a strange yellow half-light, ghastly in its effect on the appearance of men and things, and which came from no visible source, lighted the sawdust streets and plank sidewalks and made the water of the Peshtigo River look bilious. It made elder folk somehow uneasy.

Nothing happened, however. The six o'clock whistle brought the men to their shacks and the boarding house, and supper was as usual except that considerable black and white ashes drifted through the screenless windows and got into the food.

When night closed down over the village in the clearing, they could see a sullen red over the treetops to the southwest. The smoke got thicker. The old scaler, he who looked like General Grant, remarked again that he had never seen such a summer and fall, no time. At a little past nine o'clock he sat on the steps of the company boarding house and thought he heard a new noise in the night, a low moaning, soft, deep and far off, that soon changed to a steady roar. He had heard big winds in his time, and big cataracts, too, but nothing like this noise that was welling up, back in the timber.

As he peered into the night that seemed to be growing lighter every moment, the old scaler saw a whirling slab of fire come hurtling out of nowhere and drop into the sawdust street. He brushed his streaming eyes, but this slab of fire was no illusion. It was followed by another and another. The scaler yelled a long incoherent cry, and more fire rained down.

In a flash, it seemed, the splintered pine sidewalks of Peshtigo were blazing. Startled men and women crowded onto doorsteps. The top of a house leaped with sudden flames. There came a crashing and deep booming from the surrounding forest, while underneath all was the steady ominous roar that was greater than the sound of a hurricane. Now a deer, wild-eyed and shaking, flitted out of the timber and stood stock-still in the midst of town dogs who whimpered and sniffed but made no move to attack the wild one. Down the street trotted a legion of housecats, stopping to look at what was behind them.

City folk are given to thinking that things happen leisurely in the back country, where life all but stands still. City folk should have stood in the smoldering main street of Peshtigo that night. In less than five minutes all hell rode into town on the back of *no zephyr*.

It was a seething, searing hell, and the hurricane it was riding traveled as fast as light itself. It swept in so suddenly that no man could say for certain what happened in the next few moments. What is assuredly and horribly known is that two score folks, their senses blown away in that first blast of flame, rushed into the big boarding house, and there they were burned to white ash or black cinder, every last one of them.

Others fled to the river, where many drowned but a few lived it out. And those who lived it out told afterward of things that couldn't be forgotten. They saw horses and cattle, yes, and men and women, stagger a moment over the smoking sawdust streets, then go down and burn brightly like so many flares of pitch-pine. Forty years afterward, an ancient man's voice choked as he told of crouching in the almost boiling water of the Peshtigo River and of watching pretty Helga Rockstad as she ran down a blazing sidewalk, her blond hair streaming, and of seeing the long blond hair leap into flame that stopped Helga in her tracks. He had looked at the spot next morning, and he found two nickel garter buckles and a little mound of white-gray ash.

That's what the heat of two billion burning pine trees could do. The heat struck worst at Peshtigo, but it also struck elsewhere in Wisconsin that night. Religious settlers at Brussels saw the same strange yellow light that Peshtigo knew, and they shouted that Judgment Day

had come at last. So it had for many of them. Sixty-eight men fled from Williamson's sawmill, but three others crawled into a large tank of water, kept as a protection against fire, and there they were boiled until they were very tender indeed.

Seventy-five were burned to death at Little Sturgeon, close to seven hundred in Peshtigo, and weeks later the death list mounted to fifteen hundred.

It always maddened John Cameron that the Peshtigo fire was largely unknown to the great public. It would seem odd, too, if you didn't remember the date. On that same October eighth at about half past nine in the evening, flames licked at a stable in Chicago's De Koven Street, and half an hour later most of the city that lived south of the river was trying to get across the choked bridges and away from the flames. Only two hundred died in the Chicago fire. But it went down in history, even into the movies, while Peshtigo's holocaust, in which 1,500 gave their lives, remains pretty much unknown to this day.

Telegraph wires soon took the news of Chicago's troubles around the world. Clothes, provisions, and cash rolled in on every train for weeks on end, and Queen Victoria and Tennyson and Browning and Darwin sent books to found a new library.

Telegraph wires into Wisconsin had been burned before the fire struck Peshtigo. It was five weeks before the United States came to know what had gone on up there near the head of the lake, and then only in little dabs at a time. When the news finally had seeped out of the charred wilderness, relief was prompt and generous. But there was no sudden impact of horror on the public. Chicago had taken all the headlines. That's why the worst forest fire on record is so little known today.

GREAT FIRES OF THE PAST

THE Peshtigo fire, of which Mr. Holbrook writes so graphically, while one of the most calamitous, was by no means the only great forest fire in American history. In fact, the continent's list of great fires is a long one.

Tracing a blackened and cindered trail back for more than a century, John D. Guthrie, inspector for the federal Forest Service, in a recent bulletin, *Great Forest Fires of America,* found that as early as 1825 there is record of a 3,000,000-acre fire in Maine and New Brunswick in which 160 people lost their lives. This was the great Miramichi fire. Twenty years later the disastrous Yaquina fire in Oregon destroyed a half million acres of magnificent Douglas fir, Sitka spruce and western cedar. The year 1853 recorded two tragic fires—the Nestucca fire in Oregon, burning 320,000 acres, and the ghastly Pontiac fire in Quebec which reduced 1,600,000 acres of timber to ashes.

Mr. Guthrie found that the Silverton fire in Oregon covered 1,000,000 acres in 1865. That summer was very dry. Settlers in Silverton read newspapers at night by its light. The air was filled as if with a dense fog, and the ashes on the burned area were from eight to ten inches deep. It is recorded here that it was common practice then for settlers to fire the forests as they had no value. Three years later came the Coos fire in the Oregon coast region when more than 300,000 acres were burned. The same year occurred the St. Helens fire of 300,000 acres. In 1871 came the tragic Peshtigo fire in Wisconsin, burning 1,280,000 acres and destroying 1,500 people. The Big Horn fire in Wyoming came five years later, with a half million acres burned. Michigan's great fire of 1881 was next, killing 138 people and blackening 1,000,000 acres.

In 1894 the great Phillips fire in Wisconsin, though burning over but 100,000 acres, killed 300 people. That same year the historic Hinckley fire in Minnesota wiped out twelve towns, laid waste millions of acres, and cost the lives of 418 people. Smoke from the Phillips and Hinckley fires was so dense on the Great Lakes as to interfere seriously with the movements of vessels.

The year 1902 recorded what is variously called the Lewis River, the Columbia, the Cispus, the Yacolt, or the Cowlitz fire. This fire swept from the Kalama River, in Cowlitz County, south through Clarke and Skamania and east to the Wind River Valley, all in Washington. South of the Columbia River in Oregon, fires swept to the Molalla River. More than 600,000 acres were burned and eighteen people lost their lives. Property damage was placed at $12,000,000.

The 450,000-acre fire in the Adirondacks of New York happened in 1903. Then came the year 1910, historic throughout the west as one of unprecedented forest fires. Minnesota, Idaho, Washington and Oregon all suffered tremendous losses. The Baudette fire in Minnesota burned 300,000 acres and destroyed forty-two lives. Washington and Oregon lost millions of acres. Smoke was sighted 300 miles out at sea. Idaho suffered worst of all. Two millions of acres of white pine timber were burned, towns were destroyed, and eighty-five lives were snuffed out. It was here that Forest Ranger E. C. Pulaski won undying fame for heroism.

Eight years later came the tragic Cloquet fire in Minnesota—an inferno that destroyed Cloquet, a busy sawmill town of 12,000 people. All of the inhabitants except seven were rescued, though property and timber valued at $30,000,000 were lost. In the fires of that general region, out in the country and in smaller settlements, 400 lives were lost.

Among the great fires of recent years was the Matilja Canyon fire of 1932 in California. This fire spread over an area thirty-two miles long and eight miles wide, covering 220,000 acres. The great Tillamook fire of 1933 was even more spectacular, burning enough virgin timber in Oregon to equal the entire timber cut of the United States in 1932. It burned 267,000 acres. Three thousand men, including hundreds of CCC enrollees, fought this fire, which raged for eleven days. One CCC fire fighter was killed.

In August, 1937, fifteen fire fighters, mostly members of the Civilian Conservation Corps, were burned to death as fire swept over 15,000 acres in Blackwater Canyon, Shoshone National Forest, in Wyoming—one life for every thousand acres burned.

FIRE OR FORESTRY--

THE SOUTH'S GREAT PROBLEM

By WALL DOXEY
Representative in Congress from Mississippi

I LOVE to see things grow—whether it is character in men, or the men themselves, or livestock, crops or trees.

This was in my mind last summer when I was going over my farm in northern Mississippi with Walter, my colored tenant. Until a few years ago many of the fields were cropped in cotton. But with some 13,000,000 bales held over from previous years, the cotton market isn't so good, and there is small likelihood it will pick up in the immediate future. So my farm and those of many of my neighbors are in a state of adjustment. We are using less and less land for cotton, and putting more and more land into some other crop. Some of us are going in for raising livestock, and we are planting lespedeza, alfalfa, and some of the root crops for feed. But with the federal government making fair payments to those who set out plantings of forest trees, many of us are reforesting the rough land, and still more of the land is coming back to trees of its own accord.

With at least forty-eight pulp mills now in the South, and the construction of others under consideration, we are confident of a steady market for wood. Our big question is how to protect the growing forest. In this region where man is responsible for nine out of every ten woods fires, how are we going to keep the country from burning up?

Like many others, Walter has been slow to catch my enthusiasm for timber growing. But the force of economics is making him realize that cotton is on the way out, that government loans have built up an overpowering surplus. This means that the small owner must find a way of adjusting himself to a difficult situation. Many of these small owners have found that reforesting part of their land is a real help toward a solution of this problem. Perhaps the state forester and his staff, or the efforts of the State Extension Service have influenced him, but I have an idea that the actual plantings and crop adjustments which Walter has helped to work out for me on this farm have changed his mind.

We sat on a log overlooking a planting of pine which I had set out in the early spring of 1936. Over against the horizon we could see where other stands of young timber were covering the bare red soil. We had congratulated ourselves that for several years no fires had crossed these lands. Presently Walter said:

"Mista Wall, ah reckon you ain't been real mad for a long time, has you?"

I admitted that things were going along reasonably well and there had been no occasion to lose my temper.

"Well, yeste'day I done got so mad I could a killed them no count Brown boys from over at Pole Center. They done come over here rabbit hunting and stopped their little ole car down there on the flat. I happened to be up here when they got out with their guns, so I just sot. I heard 'em say, 'They's too much rough round here to find airy rabbit.' Then that blackest

Brown boy says, 'I reckon we better set a fire and chase 'em out down yonder.'

"Right then, Mista Wall, is when I come alive. I was so mad, if ah'd a gun ah sure would a used it. Anyway, they knows now that these yere trees and this yere grass is a mighty sight more important than airy old rabbit—and they won't be settin' no fire round here."

The idea that woods fires are helpful in hunting as in grazing goes back to the days of the early settlers, and beyond them to the Indians. Early explorers reported that the Indians started fires in the southern pine forests to help corral game. The Indians are also believed to have burned relatively small patches during the winter to concentrate the deer and possibly buffalo on the fresh green browse which followed so abundantly in the early spring. To this day many people burn the rough to "green-up" the country, control varmints, destroy snakes, and keep the country open. So long as there is open range with free opportunity to let the livestock run, there will be those who will set fire to a neighbor's land to prepare the range for what seems better grazing. But there are increasing numbers who realize that fires slow down the growth of trees, destroy most of the young growth upon which the future forest depends, and sap the vitality from the soil.

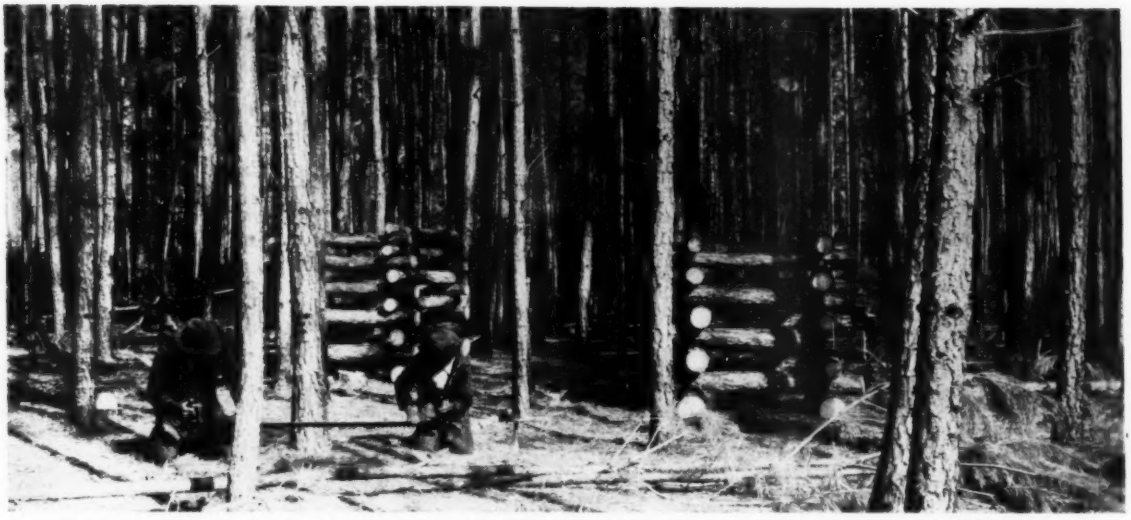
Only one acre in every sixty was burned over during 1937 on land given organized fire protection in Florida, Georgia and Mississippi—the three states which accounted for seventy-five per cent of the total area burned in continental United States. On land unprotected against fire, one acre in every three burned

Walter isn't the only one who is willing to admit that an ordinary ground fire in the woods burns up values of a dollar an acre or better. A fire that burns part of his holdings kills trees which he has nurtured since they were seedlings. Were fifty acres to go up in smoke it would hurt him as if fifty dollars had been taken from his pocket. He can see the loss in terms of grocery bills that are hard to pay, or shoes that his children need. But the total annual loss to the South from uncontrolled fires is beyond his powers of comprehension. In 1937 forest fires throughout the South were under relatively good control. But during that year, the twelve states from the Potomac River to Texas, Oklahoma and Arkansas saw over 21,000,000 acres burned over. At a dollar an acre this represents a loss of more than $21,000,000. That this was a good year is shown by the fact that the average area burned yearly during the five-year period from 1933 to 1937 was over 34,000,000 acres for the same group of states.

With a million people facing unemployment because the market cannot absorb all our cotton, we of the South can't afford to lose from $21,000,000 to $34,000,000 a year. Unfortunately, there are few people who realize that much of our land will grow pine trees at the rate of a cord an acre a year, and that there is a steady market for pine pulpwood as well as sawlogs. There are still fewer people who realize that to furnish the wood for a single large pulp mill requires as much labor as is necessary to cultivate and harvest 100,000 acres of cotton. All the forty-eight southern pulp mills are not as large as this, but in the aggregate their annual demand for wood calls for the product of several million acres. When it is realized that the future of the mills depends upon assured annual crops of wood, and these in turn depend upon satisfactory conditions of growth, it is safe to say that fewer fires will be started.

Possibly no one has done more than the late Dr. Charles H. Herty to make our people realize the value

Opportunity for forestry in the South rests largely on fire control. Above, a protective fire line in the making



With a million unemployed, and cotton on the decline, the South's new hope is in its forest crop — chiefly pulpwood

To supply wood for a single large pulp mill requires the same amount of labor as to produce 100,000 acres of cotton

that lies in pine trees. Not only was he responsible for much of the expansion of the pulp and paper industry in the South, but with his dramatic gifts he made many farmers realize how the magic of modern chemistry and engineering can turn a pine tree almost overnight into a sheet of gleaming white newsprint, silk for a lady's gown, or a steering wheel for an automobile.

Scarcely a year ago he was in Washington asking Congress to appropriate more money that the federal government may effectively cooperate with the states in the control of forest fires.

"I represent the great mass of the small timber owners of the South who have suddenly awakened in the presence of a market for small timber in the form of pulpwood," he told the senators.

"Under forest fire protection and with the practice of elementary forestry," he explained, "the foresters agree that our land will produce on an average a cord of wood an acre a year."

"Roughly speaking," he continued, "there were some 5,000,000 acres burned over in Georgia last year." Then seeing expressions of surprise on the faces of the commitee members, he hastened to explain that these were not ravaging crown fires, but mostly grass fires which burn up young seedlings and may greatly retard the growth of larger trees.

"Now," he suggested, "Let us do a little figuring. Approximately 5,000,000 acres were burned in Georgia last year.... If these 5,000,000 acres had not been burned... and if we had kept fires off of that land for fifteen years, there would have been produced on each acre of that land approximately fifteen cords of wood. That is 75,000,000 cords which at the end of the fifteen year period would have represented a value of $4 a cord, part of which goes to stumpage, part to labor and cutting, and part for transportation, including the hire of the man on the truck. That is $300,000,000 of additional assets which would have been available to the State of Georgia at the end of fifteen years if we had kept fire off of those 5,000,000 acres and continued to have kept it off during the next fourteen years."

Thus, Dr. Herty added his weight to the volume of public opinion which caused Congress to increase the appropriation for cooperative forest fire protection from $1,655,007 to $2,000,000. With more men and women of the vision and insight of Dr. Herty, the federal government may eventually go fifty-fifty with the states in protecting all our forest lands from fire.

Dr. Herty may have been a little liberal in rounding out his figures, but there is no doubt regarding the truth of the principle which he so graphically presented. According to official sources, forest and brush fires in Florida, Georgia and Mississippi during 1937 burned 15,852,760 acres. This is three-quarters of all the land burned over during that year in the entire United States. One may well ask, "Why this terrific annual loss?" Without attempting fully to answer the question one finds that of the 68,000,000 acres of forest land in these three states where protection is needed, less than 12,000,000 acres are under any system of organized protection. On these protected lands fires consumed less than 200,000 acres, or scarcely one acre in every sixty. In striking contrast to this the same year saw fires sweeping over some 15,600,000 acres throughout the 56,000,000 acres of unprotected land. This means that practically one-third of the unprotected land was burned.

It is significant that where there is organized fire protection, the burned area is held to a mere fraction of what it is on unprotected lands.

In Missisippi, for example, with a budget of $111,160 from federal, state, and private sources the state forester's protective organization covers 5,611,080 acres. This total protective cost of less than two cents an acre was so effective that in 1937 only 86,070 acres were burned. In contrast, two-thirds of Mississippi's forest lands, or 10,419,400 acres, were without organized protection. On these unwatched lands some 4,125,620 acres were burned, and forest values of over $4,000,000 were destroyed. Had ten per cent of this been spent on protection, I believe the forest fires of my state could have been held down to less than 300,000 acres. That would be comparable to an annual loss of only $300,000 as compared with present losses of over $4,000,000. The same is true of every state in the South, from Virginia to Texas. With the federal government contributing less than one-third of the cost, these states provided organized protection on over 85,000,000 acres for two cents an acre, or a total cost of $1,700,067. Admitting that two cents an acre is not enough for the most effective protection, it is significant that on these protected lands fires were held to about 1,650,000 acres. In other words, taking the South as a whole, only one out of every fifty-one acres under organized protection were burned, while those lands without the benefits of protection lost one in every six acres. Reasonably effective protection could have been extended to all the forests of the South for an additional $4,000,000. This is a lot of money, but it represents the cost of protecting the growing and producing forest in twelve of the largest states. Because we don't provide for the efficient expenditure of such a sum, we are losing over $30,000,000 in timber and soil values every year.

That forest protection pays dividends in more opportunities to earn money, a larger taxing base, and in a hundred and one other ways (*Continuing on page* 234)

"THAT CIGARETTE"

The moon and stars are dim, but there is light
Where creeping tongues of flame are spitting forth
A burning scarlet flood across the night
And threatening twilit forests to the north.
The gray smoke boils in thick clouds overhead
And fills the valleys with a seething mass
Which follows where the wayward wind has led
Thru narrow gorge and hidden mountain pass.
The red flames leave destruction in their track
For trees like fallen soldiers heap the trails
With bare and ugly bodies—fire charred—black—
With smoke still clinging to them in gray veils.
This mountain side—destroyed—will not forget
The man who tossed aside that cigarette.

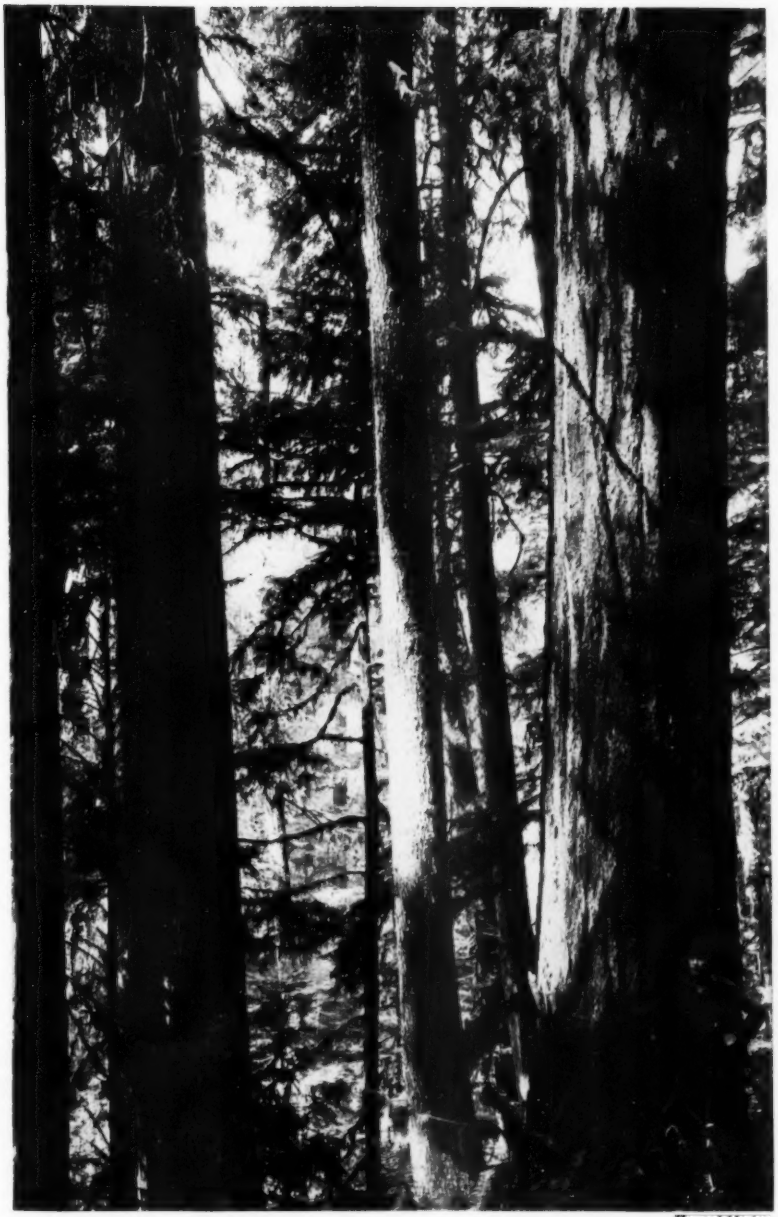
—Margaret Lentz

WHAT FOREST FIRE CONTROL MEANS TO THE NORTHWEST

Photographs by the Forest Service

By

CHARLES A. SPRAGUE
Governor of Oregon



Howard Morton

A Douglas fir-hemlock forest in Oregon—the backlog of industry, employment and general prosperity in the Pacific Northwest—if protected against fire

IT IS hardly possibly to consider the forest welfare of the northwest without thinking in terms of the national economy. Adequate forest fire control for the timbered lands of the western states may easily mean a higher standard of living for every man, woman and child in our United States! To the northwest itself, such forest protection may well spell the difference between lasting prosperity and gradual ruin. China, Palestine, Spain, our own devastated forest lands, are but mute evidence of the results of uneconomic planning. In the devastation of these lands, uncontrolled fire played a large part.

The present timber stands of the four states of Oregon, Washington, Idaho and Montana comprise fifty-five per cent of the nation's remaining supply of saw timber. The total coniferous stand of Canada with her great stretches of forest land exceeds the timber in these four states by only ten per cent.

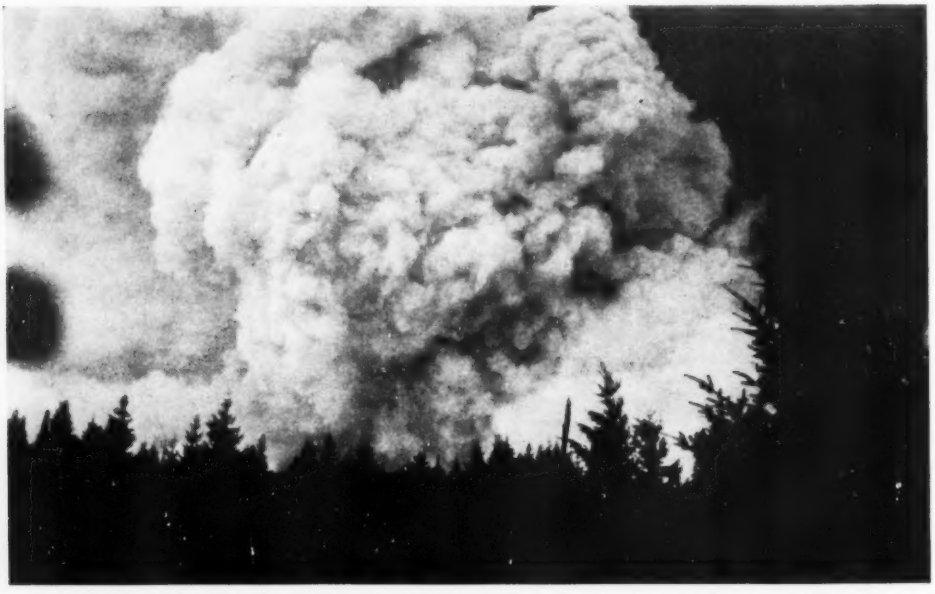
Reasonable national annual consumption of lumber in the years to come has been estimated at thirty-two billion board feet. This yearly drain is at present largely borne by the two great timber-producing regions of the nation—the South and the Pacific Northwest. None of the other regions cut nearly as much as they consume but draw heavily on these two chief sources of supply. Moreover the South is already losing ground in production as her softwood stands are increasingly utilized for the old uses in addition to such new uses as pulp production makes possible. For the next few decades the ability of the United States

to produce enough timber for healthy growth will depend on how far the Pacific Coast region can go in making up the deficits of the other forest-producing areas.

Furthermore, Canadian forests are already greatly depleted; Russia's development is using practically all of her wood growth and most of the other timber-exporting countries of the northern hemisphere are exporting at a rate which cannot be increased to any appreciable extent. The southern hemisphere has an abundance of hardwoods but lacks the valuable softwoods of commerce.

Recent forest surveys have given us a pretty clear picture of the forest situation in the United States as a whole. It shows that the Pacific Northwest contains some of the best timber-growing lands in the United States; that it contains an overwhelmingly large per cent of land which is clearly best suited to timber growth and that some of the most valuable species of the trade are found therein. Western white pine, ponderosa pine, Douglas fir, Sitka spruce, western red cedar, sugar pine, western hemlock and others grow in the area. Timber production and the manufacture of its products will undoubtedly be the largest single industry in the region for decades to come. Realizing this it would seem that sound economy would dictate careful protection of forest lands from damaging agencies. If proper steps are taken now, this area may produce timber in the present quantities for all time. Sixty per cent of the people may directly or indirectly derive their livelihood from the forest lands. Where we are now producing to only one-third capacity, we should be able to step up our timber production somewhere close to the maximum in order to supply drains instituted by new uses for wood whether in the form of boards, wood fiber or chemical derivatives. It is not out of reason to visualize an entire northwest civilization built upon this reproduceable resource. These goals can be realized, however, only under proper land management. One of the basic precepts of such land management is protection from fire.

Protection from fire is made especially difficult in this area by a combination of factors which have long been the despair of forest protectionists. Abundant rainfall in all but the summer months allows the growth of enormous volumes of forest fuels; grass, brush, and forest trees form a dense covering on a great proportion of these lands. During the summer months, moreover, there is usually an absolute lack of moisture for a period of from sixty to ninety days and the months immediately preceding and following may have only a small amount of precipitation to their credit. In addition the prevailing winds during the summer may be from the north or east bringing dry air currents that absorb the last bit of moisture from dead forest fuels and leave the woods in a state extremely susceptible to the initiation and rapid spread of fire. Combine with this picture the item of risk offered by an automotive-minded public traveling into the forests, leaving campfires, cigarettes, and in some cases starting fires maliciously, and we have a condition which necessitates complete and scientific protection if management policies are to be considered sound.



An Oregon skyline when fire wreaks its vengeance upon man and nature. "We are not killing the goose that lays our golden eggs," declares Governor Sprague, "we are slowly burning her up."

In the past, largely because of inadequate finances for proper protection, devastating fires have swept the forest lands of the region. Once out of control, fires have done untold damage. One need travel for only a few hours in the forest lands of the west to see reminders of past tragedies—barren hillsides, eroded streambeds, gaunt whitened snags on the skyline, abandoned sawmills, ghost towns. Provide adequate protection from fire, catch the blaze while it is small or tragedy is the result. The forest history of the northwest is replete with examples—the Nestucca fire of 300,000 acres of destruction; the Silverton fire said to have covered a million acres; the Coos fire; the St. Helens fire; the Big Horn fire of Wyoming; the Idaho fire of 1919 that covered a strip 120 miles long and burned seventy-four firefighters to death; the Tillamook and Bandon fires.

These and more are monuments to man's folly! An enormous investment in green timber, vital to the welfare of a great democracy, men crying for work and for opportunity to help protect this great gift of a bounteous nature! And appropriations by an unen-

A scene in northern Idaho where forest wealth enriches the land as far as the eye can reach

lightened people only half enough to do the job! The loss of human life, improved property, timber; the deterioration of the soil and the sponge action of the forest floor; the destruction of watersheds, wildlife and esthetic values; these represent the price of poor planning. The worst of it is we know what we are doing! The results are written before our eyes and the costs are calculable from past averages.

Every voting citizen who knows the situation and does not demand action to rectify it is as guilty as the well-informed legislator who says we can't afford such protection. Afford it! Can any intelligent people afford the conditions that follow the lack of a well-supported forest protection policy? Can we afford to economize now when it will mean loss of wealth for decades and, in some cases, centuries to come? The fault lies with people who demand millions in expenditures for highways and other development but little or nothing for the protection of the basic resource which makes possible those expenditures. We are not killing the goose that lays the golden eggs—we are slowly burning her up!

Too bad that more of us can't be out on the fire line during the hot, dry summer months, working feverishly while the heat blisters face and hands and the flames pyramid into tree tops, (*Continuing on page* 225)

Another scene in Idaho that tells its own story. Here formerly stood one of the finest forests of western white pine in the Inland Empire

FIRE UNDER THE MIDNIGHT SUN

By W. J. McDONALD

Bragaw's Studio

Fires in Alaska run unrestrained for weeks until stopped by natural barriers, sometimes almost at the outskirts of cities. This is Anchorage — note the fires burning in the near distance

SHORTLY after the turn of this century, the writer—as a young man suffering with the gold fever—wandered through a good portion of that vast plateau we know as Interior Alaska and over a section of the coastal country fronting on Bering Sea.

Here was a new or virgin country in every sense of the word, unpeopled and unspoiled. The '98 rush of prospectors to the Klondike of Canada and Interior Alaska had started only a few years before. The destroying hand of wild fire, even at that date, had already left some ugly scars, but in the main the forests, interspersed grasslands and treeless arctic tundra retained their lush coverage. Herds of countless caribou roamed the rolling country as the bison once roamed the High Plains and the abundance and variety of wildlife were a joy to an outdoor man.

Last summer the writer revisited the lands of his early adventure. On this trip, travel afoot and by the time-honored river boat were heavily supplemented by rail, motor and airplane. Other notable changes had taken place. The new, well-graveled highways had comfortable roadhouses spaced conveniently along them. Automobile stages and trucks carried travelers and freight from the southern coast through Interior Alaska to a point on the Yukon River just short of the Arctic Circle. Agricultural communities had sprung up, especially around Fairbanks and Matanuska. Cattle raising, dairying and poultry farming and become firmly established enterprises in several places. The Alaska Railroad was now available to transport the heavy machinery needed at the formerly remote gold placers. The increased price for gold had greatly quickened the tempo of life at isolated village and trading post.

Noted was the Alaska University with its two subsidiary agricultural experiment stations; Mount McKinley National Park with roads and tourist hotels to show off its two million acres of lofty ranges and glaciers; the casual way in which the airplane is used by every one to cover a territory one-fifth the size of continental United States.

Yes, the writer admits that Alaska has "advanced" in the past thirty years. However, in the process of advancement, one highly important matter has been woefully neglected. The proverbial "Man from Mars" would have thought that after America's sad experience with neglected natural resources in developing its West she would not repeat the same mistake in developing this fine northern frontier, but the same ignoble record is now being written over this new land in massive strokes that all who run or rather fly, can read. Millions of acres of forest, brush, grass and tundra lands have been scourged by fire and the devastation continues. The annual rainfall, north of the great mountain barrier along the south coast that cuts off the moisture-laden winds of the Pacific, is between seven and fifteen inches—no more than that of Arizona. The permanently frozen subsoil,

which constantly gives off moisture during the short but warm twenty-four-hour daylight summer season, saves the region from becoming a desert, but the heavy ground cover of moss, brush and timber becomes highly inflammable at this period. Since 1900 appalling toll has been taken of a vegetative cover built up through the centuries, and of an abundant wildlife which this cover supports. Along every main traveled road and navigable river, and around every settlement, great burns are a prominent feature of the landscape. Frequently they are too extensive for the eye to encompass from one spot, even from a high mountain.

In the summer of 1935, the smoke from a fire in the big game lands of the Iliamna region was reported by airplane pilots as constituting a menace to air travel over an area as large as an average State. It had been burning for more than two weeks and had advanced fifty miles over a front many miles in width. A fire in the Kvichak River country the same summer burned for two months and covered an estimated area of 1,000 square miles in a region teeming with big game and other wildlife.

June and July of last year witnessed large fires in the vicinity of Fairbanks and an airplane passenger reported sighting nine separate large fires burning at one time in the Yukon River drainage area between Fairbanks and Nome. Heavy fires were also reported in the upper Tanana and Goodpaster regions.

No organization—federal or territorial—has been established for fire control on these open public domain lands of Interior Alaska. The Forest Service is far away on its rain-soaked National Forests threading the southern coast. The Alaska Legislature quite naturally places the responsibility elsewhere as the jeopardized lands and resources are in federal and not territorial ownership. Fires run unrestrained for weeks until stopped by natural barriers such as rivers, or the advent of the fall rains. They originate with hunters, prospectors and other travelers, whose neglected camp fires and mosquito smudges escape and lead to holocausts; with clearing operations for homesteads and placer mining, where fires are often set without thought of preventing their spread to timber or grass of the adjoining public domain, and with the hundred and one causes that the fire prevention agencies in continental United States so patiently list at the close of each fire season. The only cause missing, or practically so, in Alaska, is lightning. The Territory has little lightning and almost all fires are man-caused.

The fire-protection efforts of the federal government on these areas at this time are almost negligible. The Alaska Railroad takes steps to prevent and suppress fires originating on and adjacent to the right-of-way. No educational campaigns are conducted to instruct the public in prevention or suppression measures, or to show the great loss that the Territory suffers as the result of fire. Ranger stations, guard stations, lookouts, fire telephone systems, fire lanes, smoke chasers, pack trains, tool caches, fire trucks, all of the familiar items of fire control paraphernalia seen in other fire hazard sections of our (*Continuing on page* 231)

Alaska's timber needs organized fire protection — it is essential to economic development in this far northern country. Here is seen a typical stand of native white spruce and birch and below — a beautiful lake shore, gutted by fire

FIRE OVER THE LAKE STATES

By SAMUEL T. DANA
Dean, School of Forestry and Conservation, University of Michigan

Minnesota Tourist Bureau

Some of the nation's most disastrous forest fires have occurred in the Lake States. Above is pictured a recent fire raging through northern Minnesota near Red Lake

THE three Lake States are sometimes cited as a horrible example of the devastation which results from improper handling of the forests. The great bulk of the virgin timber has been cut; large areas of land are unproductive or are restocking poorly with relatively undesirable species; the tax base has been greatly reduced as a result of shrinking property values; and many once prosperous communities have dwindled or even disappeared. Altogether too frequently has poverty succeeded wealth and ugliness replaced beauty.

These conditions are due in part to the removal of the magnificent forests of white pine, red pine, and northern hardwoods for which the region once was famous, but far more to the fires which in earlier days universally followed cutting. Some of the worst forest fires which the country has known have occurred in the Lake States. In October, 1871, for example, a fire in Michigan is estimated to have covered some 2,000,000 acres, while in the same year the Peshtigo fire in Wisconsin burned nearly 1,300,000 acres, with a loss of 1,500 lives. Ten years later another Michigan fire swept over 1,000,000 acres and killed 138 people. In the fall of 1894 a 160,000-acre fire destroyed the flourishing town of Hinckley, Minnesota, and left a toll of 418 dead in its wake. As recently as 1918 the Cloquet fire in Minnesota covered 250,000 acres, with a loss of 438 lives. Forests, industries, towns, and individuals alike have repeatedly felt the scourge of the red demon.

Fire-protection organizations have existed in each of the Lake States since about the beginning of the present century. It is only within the last fifteen or twenty years, however, that they have received anything like the support justified by the importance of fire control as one of the basic measures necessary to safeguard the present and future prosperity of the region. Today, in spite of steadily increasing efficiency, their work is still handicapped by public apathy and inadequate appropriations.

Protection against forest fires in each of the three Lake States is handled by a special unit in the state departments of conservation. The total area now being protected approximates 52,000,000 acres, exclusive of some 6,000,000 acres in the National Forests which are handled entirely by the federal Forest Service. The first figure includes all of the forests and adjacent brush, grass, and bog lands which are believed to need organized protection by a state agency. It comprises the "wild land" areas of the region but excludes several million acres of farm woodlands, where it is assumed reasonably satisfactory protection can be provided by the individual owners and township officials.

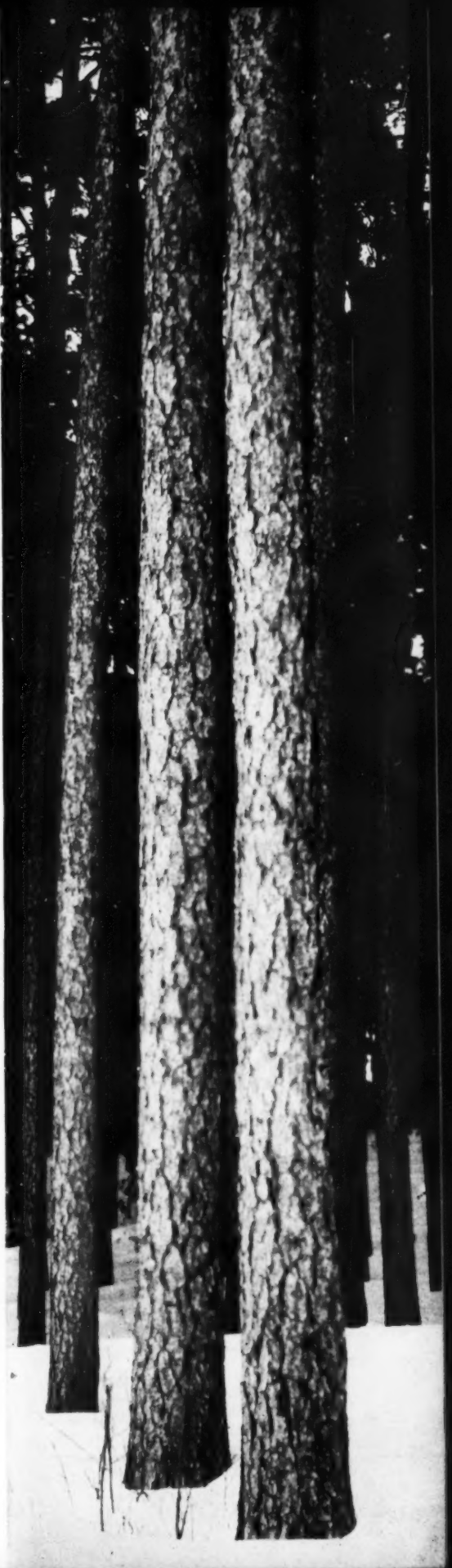
During the period from 1929 to 1938 there were nearly 70,000 fires in the protected area in the three Lake States. This is altogether too many, particularly in view of the fact that they burned over annually some 600,000 acres of state and private land with an average annual property loss of approximately $900,000. More than half of this area and two-thirds of the loss was in Minnesota, where grassy clearings through the forest, scattered settlers, and extensive areas of peat bogs make the fire danger especially serious. The area burned fluctuated greatly from year to year, varying from a total of 48,000 acres in 1935 and in 1937 to about 2,000,000 acres in 1931, a range of nearly 4,000 per cent. The damage fluctuated still more violently from a minimum of $44,000 in 1937 to a maximum of over $4,000,000 in 1931.

On the average, slightly more than one per cent of the protected area was burned each year. While this is a little less than the average for the entire United States, it is still too high. Most of the area burned consists of young growth in various stages of development, with considerable areas of grass, brush, and bog land. The average fire during the ten-year period covered eighty-five acres. This is much larger than it should be, both because of the actual loss involved and because fires of this size are more likely to result in conflagrations. So far as the individual states are concerned, Wisconsin has the lowest figure—slightly less than two and a half acres for the average fire in 1937, while Minnesota has the maximum with an average of 357 acres in 1931 for each fire. Michigan's record in this respect is much more uniform than either of the other two states. The estimated loss for each fire in the region was $130, and the loss for each acre burned $1.55, both of which are undoubtedly low.

On the whole the fire record was considerably better in the second half than in the first half of the decade. This was due in part to increasing efficiency in the protective agencies, but still more to less dangerous weather and to the assistance rendered since 1933 by the Civilian Conservation Corps.

The total bill for fire prevention, preparedness, and suppression on state and private lands averaged nearly $1,400,000 a year, including a federal contribution under the Clarke-McNary Act of $262,000, or just less than one-fifth of the total. In addition, fire-control expenditures on the National Forests in the three states averaged $255,000 a year, more than half of which came from emergency funds.

Nearly three-fourths of the money spent by the state conservation departments was used in attempting to prevent the occurrence of fires and in getting ready to put out those which did occur. The ideal situation would be one in which prevention activities were so effective that fires are reduced to a neglible number. There is, however, apparently so little hope of attaining this Utopia, at least in the near future, that it becomes essential to spend large amounts in being prepared to put out promptly fires which are bound to occur in spite of all precautions. Activities in this field include the building and maintenance of fire-lookout towers, fire breaks, truck trails, telephone lines, and other permanent improvements; the pro-



Michigan, Wisconsin and Minnesota once produced some of the finest forests this country has known. But forest fires which universally followed cutting have left poverty and ugliness where wealth and beauty might be today had proper protection been provided

Minnesota Tourist Bureau

Minnesota Tourist Bureau

Seventy thousand forest fires — on protected areas alone — is the grim record for the three Lake States for the past ten years

vision of fire fighting equipment such as axes, rakes, shovels, torches, plows, trucks, tractors and pumps; and the organization of fire fighting forces, with adequate food, bedding and other supplies to meet their needs while on the fire line.

As in most of the eastern states, lightning is a relatively minor cause of forest fires, most of which result from carelessness or maliciousness on the part of man. Leaving out miscellaneous and unknown causes, smokers and campers are responsible for about fifty-one per cent of the fires in the region as a whole, while debris burning, railroads and lumbering, which might perhaps be classed as the "industrial" group of causes, are a fairly close second. The situation varies greatly in the different states, however, smokers and campers being a much more frequent cause of fire in Michigan, and debris burning, railroads, and lumbering more frequent in Minnesota, whereas in Wisconsin the two groups are about equal in importance. Debris burning is a particularly prominent item in parts of the region, and altogether too many fires result from carelessness in connection with land clearing and the disposal of brush. The figures also indicate the outstanding importance of reducing the number of fires by increased educational efforts to make the general public more fire conscious and more careful in their use of matches, smoking materials, and camp fires.

Considerably larger expenditures are essential to place the control of fire in the region on a reasonably adequate basis. While losses are now relatively slight in such favorable years as 1935 and 1937, serious damage can result during an unfavorable year, as was illustrated in 1931 when nearly 2,000,000 acres were burned with a damage of over $4,000,000. When the weather is good it is sometimes very, very good, but "when it's bad it's horrid." At such times a single slip in the protective machinery may readily result in a veritable holocaust.

Total expenditures now average slightly over two and a half cents an acre of area protected, while those most familiar with the situation. (*Continued on page* 234)

Olson

All that was left of the busy sawmill town of Cloquet in Minnesota in 1918 when a 250,000-acre forest fire claimed 438 lives

For a Public Will

FOREST FIRES once started are fought like wars—on the firing line. And as with wars, forest fires are prevented by a vibrant public will to prevent them. America needs that will—terribly. It can be provided only by the citizens who constitute its public.

This issue of **AMERICAN FORESTS** is dedicated to the creation of such a will. If its pages, mirroring repellent destruction of beauty and wealth and living things, succeed in burning rebellion in the breast of some of our people, its publication will be not in vain. America needs a rebellion of consciousness to bring to life a public will to stop forest fires.

The editors derive no pleasure in spreading the lurid form of fire through all the pages of a single issue. In doing so they are dominated by the conviction that a public will to prevent forest fires, if it is to emerge as an ever vibrant, aggressive, vigilant force, must be seared by the torch of truth and knowledge.

Such a torch this April number of **AMERICAN FORESTS** essays to be. It is written not as a passing drama of words and pictures but to place in your hands, reader, a challenge of facts with which to arouse your fellow citizens to bring to bay with guns of public opinion a national enemy that is dropping fire brands somewhere in our land at the rate of one every three minutes day and night.

That every copy of the issue may serve this end is our sincere hope. After reading, pass your copy to a friend or neighbor, to a library or school. Make it a circulating hammer for the forging of that public will to prevent and control forest fires without which there can be no sure or lasting preservation of those natural heritages that sustain American life. If you desire additional copies for wider placement, they are available.

Patriotism in America may lack the virility of old and with some it may be out of fashion, but it is not dead. There are still millions of people who, informed and made fact-conscious that the cry of "fire wolf" means red wolves in never ending packs—as run the fire wolves today—are ready and eager to become Paul Reveres on the public opinion highways of our country.

By those highways only, can we ever hope to attain a public will to prevent forest fires.

Ovid Butler

Editor

FIRE, FLOODS, AND EROSION

By H. H. BENNETT
Chief, Soil Conservation Service

A FOREST of charred stumps is many things to many men. It is the shambles of a beautiful environment; it is the ruin of a playground for men and home for wildlife; on the balance sheet of industry and trade it means lost assets—lumber for homes, spindles for cotton mills, cellulose for rayon, pulp for newsprint. Fire quickly and completely destroys values that were centuries in the making.

Too often, forest fire is also the forerunner of flood. The destruction wrought by fire in the hills frequently has its aftermath in the destruction wrought by raging waters in the valley. Rains falling on burned over slopes find no impediment to quick runoff; the water rushes from the land faster than streams and rivers can carry it away.

A few months ago, the people of Los Angeles were given a vivid illustration of this destructive fire-flood alliance. One afternoon, after 272 consecutive rainless days, fire broke out in a small, chapparal-covered canyon just outside the limits of the city. Whipped by a stiff wind, the flames spread over the tinder-dry brush faster than a man could run, and before they were brought under control, almost 12,000 acres were denuded.

Then, less than three weeks later, the entire burned area was drenched by a series of rains that totalled nearly ten inches over a six-day period. Tons of water rolled down the steep canyon walls, tearing the very face of the earth loose from its moorings. Huge boulders, uprooted trees, whole sections of hillside were carried along by the irresistible wall of water. Beach properties were heavily damaged, highways were buried as much as four feet deep by mud, rocks and debris.

41st Div. Aviation, Washington National Guard

The forest is probably the nation's most powerful single bulwark against excessive soil wastage and runaway water

Fortunately, the thickly populated sections of Los Angeles County did not feel the full impact of this flood. Because there is only a narrow flood plain separating the Santa Monica Mountains from the Pacific Ocean, most of the eroded debris went direct-

ly out to sea. But the mass movement of soil and water in those fire-swept canyons will not be quickly forgotten. For the people of that locality it showed very graphically the danger that lies dormant, to a greater or less extent, on all burned slopes.

Most fires, of course, are not so quickly followed by flood and erosion. Back in 1928, the City of Burbank, also in California, was submerged after a rain that was described by valley residents as a "cloudburst." But although the rain was intense for ten minutes or more, the actual recorded fall was only slightly more than an inch over a period of three hours. The real reason for the Burbank flood of 1928 could have been found on the slopes of a nearby canyon, which was almost completely denuded by a chaparral fire the previous year. During the flood this particular watershed poured forth almost three times as much water as adjacent unburned canyons and showed the only substantial loss of soil—more than 25,000 cubic yards. The connection between fire and flood in this case was blurred by the passage of time, but it was no less direct and real than in the case of the recent flood in Los Angeles.

There is, however, another reason why the flood-producing and erosion-speeding impact of fire is

41st Div. Aviation, Washington National Guard

That is, until there is fire. Nothing affects the forest's value for soil conservation and flood control quite as much as fire. Here is what happens. Soft, water absorbing soil is destroyed, runoff is greatly accelerated, and gully erosion sets in

J. G. James

not always fully appreciated. Few forest fires occur, like those of southern California, on slopes that loom almost directly above areas of dense population; and few burned hillsides lose their soil in such spectacular landslide quantities. Ordinarily, the damage takes place more quietly and gradually back in the upper reaches of a far-flung natural drainage basin.

But the long-range effect is always much the same. Eventually, the soil on every barren slope is worn thin by the continual beat of rains. Sooner or later, every acre of scorched earth helps to choke downstream drainageways with silt and overburden them with water. All the evidence points to only one conclusion: fire that destroys any kind of hillside cover—grass, brush, chaparal, or a full forest growth—invariably increases the potential strength of floods and makes the problem of their control much more difficult and hazardous.

If some inventor with fertile imagination ever tried to devise the perfect mechanism for guarding the soil from erosion and regulating the natural movement of water, it is extremely doubtful if he could improve much on a natural woodland growth. When a heavy rain falls on a healthy stand of timber, its force is immediately broken and dissipated by the crowns of the taller trees. Water clings to the leaves and branches or trickles down the trunks instead of pounding away at the soil. Underbrush and smaller trees act in the same way as a second line of defense. This lower growth also intercepts the rainfall and delivers it slowly to the air or the earth. Litter on the forest floor serves as the rear-guard. It soaks up part of the rain that penetrates the higher canopies and keeps the soil itself open and porous. In an undamaged woods, it seems as if everything conspires to prevent rainfall from concentrating and running swiftly off the land.

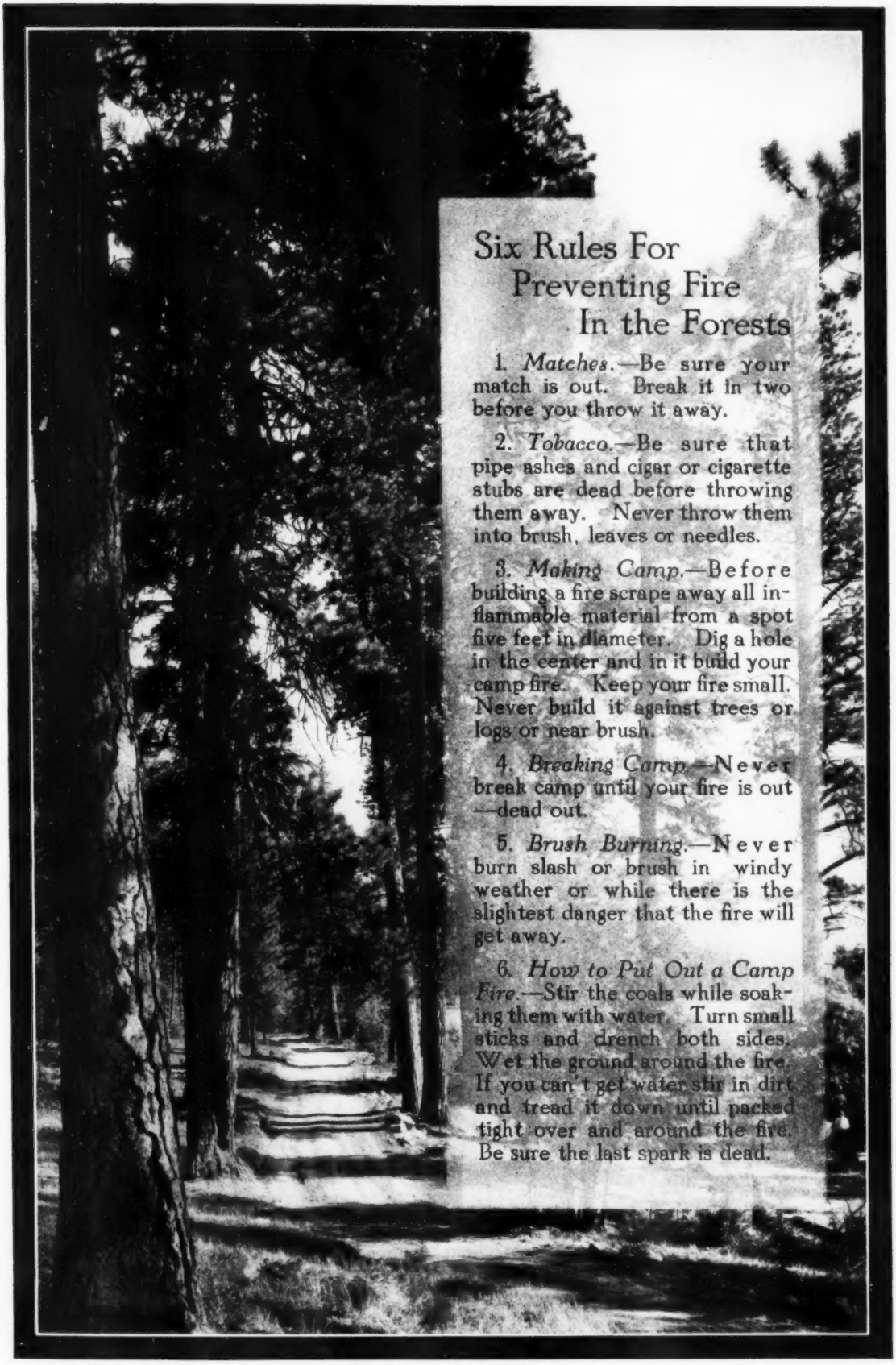
This natural system of checks and balances, however, is rather delicate. An unwise harvest of timber, for instance, can greatly impair its efficiency. A grazing herd of livestock will often leave it profoundly disturbed. But nothing affects its value for soil conservation and flood control quite as much as fire.

In a burned woodland, the very structure of the soil is changed. Following the destruction of organic matter and beneficial bacteria by flames, the soft, crumb-like surface that normally prevails under a leaf mold gradually gives way to a harder, more compact condition. Pelting rains hasten the process along. By dislodging tiny soil particles and taking them into suspension along with charred plant debris, they produce a muddy kind of runoff that tends to seal over the ground surface and make it almost impervious to water. Naturally, this compacting action alone means a tremendous increase in the amount of runoff and the rate of erosion. When it is combined with the demolition of all protecting overgrowth, soil and water losses may be multiplied several thousand times over.

Controlled experiments have shown that the mere destruction of undergrowth and litter by ground fire can have surprising effect on the soil. On the grounds of the Soil and Water Conservation Experiment Station at Statesville, North Carolina, a scientific test of this kind was started several years ago in a virgin forest area. Two woodland plots with practically identical conditions of soil, slope, and cover were selected and isolated from the surrounding soil by steel strips countersunk in the earth. One of the plots has been systematically burned free of underbrush and litter with a blow torch every year since 1932; the other has been left in its original state. Measuring vats at the foot of these woodland segments tell a graphic story after every heavy rain—a story that links fire with floods and soil erosion. Almost without exception, the vat of the burned plot is heavy with water, dark with soil. Frequently the other vat is scarcely damp on the bottom. (*Continued on page* 229)

41st Div. Aviation, Washington National Guard.

The destruction wrought by fire in the hills too often has its aftermath in the destruction wrought by raging waters in the valley below, as shown by this flood along the Coeur d'Alene River in Idaho



Six Rules For Preventing Fire In the Forests

1. *Matches.*—Be sure your match is out. Break it in two before you throw it away.

2. *Tobacco.*—Be sure that pipe ashes and cigar or cigarette stubs are dead before throwing them away. Never throw them into brush, leaves or needles.

3. *Making Camp.*—Before building a fire scrape away all inflammable material from a spot five feet in diameter. Dig a hole in the center and in it build your camp fire. Keep your fire small. Never build it against trees or logs or near brush.

4. *Breaking Camp.*—Never break camp until your fire is out—dead out.

5. *Brush Burning.*—Never burn slash or brush in windy weather or while there is the slightest danger that the fire will get away.

6. *How to Put Out a Camp Fire.*—Stir the coals while soaking them with water. Turn small sticks and drench both sides. Wet the ground around the fire. If you can't get water stir in dirt and tread it down until packed tight over and around the fire. Be sure the last spark is dead.

STOP FOREST FIRES—

50,000 FIREBRANDS

by E. T. ALLEN

WHEN human distress comes to our eyes or ears, we act first and argue afterwards. I wish there were some way to get good, warm human emotion aroused to its proper place in viewing the forest-fire picture.

To all too many in this land, and all too often, the picture is a vivid one, and human above all else. There is no more pitiful thing, I think, than the settler's family, after years of privation and incredible labor, surveying, without food or shelter, the blackened ruin of all their hopes, or fleeing in refugee trains they know not whither. And sometimes the unburied are left behind. I wish all citizens and particularly all lawmakers might see this once.

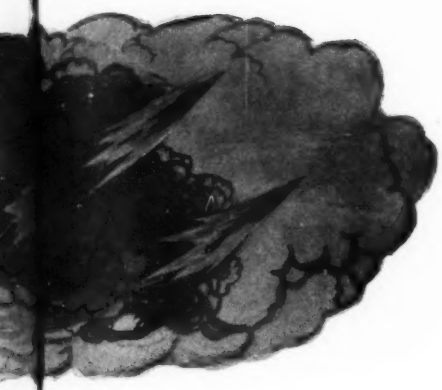
There is no more discouraging thing to little pioneer communities than to face the winter with crops, schoolhouses, and bridges gone, even though they may have saved their homes and lives. Have you ever talked with them?

There is no greater hardship and exhaustion, unless in war, or sometimes at sea, than that of thousands of sleepless and smoke-blind fire fighters, every year, while the rest of us are seeking summer pleasures. Have you ever seen them?

There is no more terrifying thing to witness, unless it be volcanic cataclysms, as at Katmai or Pompeii, than the roar and crackle of an advancing fire front, or the blackness of midnight at noon, and navigation impeded for miles at sea, caused by the settling smoke from scenes that in the darkness we can only imagine. Have you ever had this experience?

I suppose these things are not as important economically as the less spectacular eating away of national prosperity by countless wealth-destroying fires from coast to coast. But to me it seems as though they lay a heavier charge against the man with the firebrand, and against all of us who have public responsibility. Not one of us, perhaps, but can lay on other shoulders greater responsibility than ours for stewardship of the country's resources. But on whose shoulders shall rest our personal callousness or lack of effort, when, as surely as seasons come and go, this means to many, this year and next, impoverishment, suffering, and death; when it means many another Wallace, Hinckley, and Cloquet horror; when it means harder conditions of life for all our country's children? We think too much of fire as an abstract force of nature, and of its results in terms of economic loss; for, although human nature is mercenary enough, it does not arouse to deal with such abstractions as it will when it realizes that the cause of fire is human dereliction, and that its consequence is human suffering. . . . We have about 172,000 recorded forest fires a year in the United States; 500 to 1,000 new ones a day during the drier months, with thousands burning simultaneously during much of the season. . . .

Our annual forest fire bill is well over $40,000,000 a year, but for round numbers call it that—$40,000,000—all reckoned on the average year, not the worst, and on present forest conditions, as though everything were replaceable by opening new fields, without considering the incident cost increases and distresses of future forest shortage. Forty million dollars a year already;



REPRINTED — BECAUSE IT IS AS TRUE NOW AS IN 1925, WHEN FIRST PRINTED IN "AMERICAN FORESTS"

growing because values involved are growing; and very largely, if not wholly, preventable! I will say that whether or not this represents sufficient attack on our prosperity to be called a national menace, the mental processes that are content to let it go undealt with are a menace to any nation.

If riot or invasion should sweep this country, killing unprotected settlers, plundering banks and treasuries of $40,000,000 of the people's savings and business capital, and, by destroying the basis of commercial enterprise, reduce our income by hundreds of millions more, the catastrophe would startle the world. If this disaster should threaten to recur the following year and every year thereafter, annually taking millions of dollars from our people, paralyzing our industries, threatening future famine, and, worse still, destroying by millions of acres the very productivity of our lands, the situation would be unbearable. It would dominate every mind. All else would be forgotten in preparation for defense.

Such a parallel is fair. Although less spectacular, forest fire destruction is as real as that of such a riot or invasion. And it is more far-reaching in effect on future prosperity. So far, we have pictured only its current sacrifice of wealth, life, and happiness.

There remains to be appraised and faced its sinister threat against every forest step this nation advocates, every purpose of forestry reform, every forestry investment, whether private or public; every attempt to assure this country a wood supply or to keep its forest land surface a sustaining national asset....

Our present achievement in the forest-fire line being 172,000 fires and 36,000,000 acres burned over, we are averaging more than 200 acres to the fire. Each, then averages two-thirds of a mile in diameter. Lining up the 172,000 so they touch, they extend 114,000 miles; so each year we run forty lines of fire, each two-thirds of a mile wide, across this country from coast to coast; and if we cut out the prairie and farm country, keeping these lines in the woods, it will not take very strong winds to drop sparks anywhere between them.

This is the handicap we place on every public and private agency we have the effrontery to hold responsible for the perpetuation of American forests, and to criticize for their negligence. We accuse the lumberman because he does not face this handicap and still try to provide more material for the national bonfire. We maintain forest schools to produce foresters. We ask the taxpayers to finance public forests. We expatiate on the requirements of silviculture and discuss laws to make them compulsory. We even get a national law that does recognize the true situation and authorize the Government to cooperate in dealing with it. But the appropriation we make for doing so is in keeping with the spirit of a 172,000-fire country. A nation's spirit lives not in its laws, but in its songs, and ours is "Keep the Home Fires Burning." Our progress will be in fighting them a little harder and more skillfully. The 114,000-mile fire line may be only half a mile deep, instead of two-thirds of a mile. If I have succeeded at all in making a picture (*Continuing on page* 239)

WILL

By DUDLEY HARMON
Executive Vice-President,
New England Council

The 1938 hurricane levelled great forests, leaving in its wake greater potential danger from forest fire than New England has ever known in all her history

EVER since the great hurricane of September 21, 1938, swept through New England, the Agricultural Committee of the New England Council has worked in close cooperation with the various state and federal emergency organizations in an effort to develop a unified program designed to bring the greatest possible measure of protection and rehabilitation to the affected areas. As a result of this activity, certain factors pertaining to the methods of forest fire fighting have been brought to the attention of the Council. This article is intended to outline briefly the problem that confronts New England as has been indicated by the several agencies now dealing with the forest problem.

The great storm swept over some 14,000,000 acres in New England. In its wake lay broken tangled trees, piled in wild confusion. Scattered trees or groups of trees were blown down at intervals over the whole area. Heavy timber damage occurred in blocks of varying size, from a few acres up to five hundred acres or more, wherever tall trees were exposed to the full force of the wind. Some of the areas of windfall were closely spaced; others were far apart. It was as though thousands of separate whirlwinds had struck, each leaving its mark on the forest.

The heavy loss of life and the widespread damage to improved property claimed first attention when the storm had passed. Then came the realization that New England faced a greater danger from forest fire than ever before in its history. Once the tangled debris became thoroughly dry, it would provide the fuel for fires of tremendous intensity, fires so hot in places that they could not be approached by fire fighters. If there happened to be several weeks of dry weather followed by high wind, fires starting at such a time might blow from one area of down timber to another and become widespread conflagrations, with imminent danger to all in their paths.

The first step toward meeting this dangerous situation was to remove as much of the debris as possible before the spring of 1939. Thirty-two CCC camps and WPA crews, which have aggregated 15.000 men, were put to work cutting and piling the material along roads and adjacent to buildings and making safety strips through the larger areas of windfall. When the fall fire season ended in 1938, fortunately without any disastrous fires, the crews started burning the material they had piled. This work continues. By spring, it will have greatly lessened the amount of fuel on the ground, and by next fall, it may be virtually completed in some of the states. But the volume of the debris is too great to make possible its complete removal. The best job that can be done, I have been informed, will leave a greatly increased hazard until the debris decays. That will take from five to ten years. In the meantime, fire fighting resources must be strengthened to cope with the fire danger.

A review of the forest fire fighting systems of New England indicates that most of the states place forest fire fighting in the hands of town fire wardens. The state foresters carry on fire prevention activities, and provide detection—lookout tower—systems, and to some extent, assist the towns in fighting fire. But they do not, except in Connecticut, direct fire fighting. They do not have legal authority to control the town wardens in that activity. Consequently, they cannot effectively coordinate the fire fighting resources of the several towns nor the resources of the towns with those of the state. Legally and actually, each town fire warden is independent in his town. On those occasions when he needs help, he asks for it from adjoining towns or from the state. Such cooperation is gladly given as a neighborly act.

This arrangement functions reasonably well under ordinary conditions, but it has a tendency to break down when fires become too serious for the limited man power and equipment of the local town. It is likely to be weak as a means of meeting the extraordinary hazards of the next few years in the hurricane area. It is to be hoped that the state foresters will secure from their legislatures full authority to direct, for their various states, all fire control in at least the towns within the hurricane area.

There is every reason why the town fire wardens should accept state supervision in the interest of promoting full public safety. If the state foresters are put in full charge of fire fighting, they can unite all agencies into a single program of action. This will eliminate delay and confusion. (*Continuing on page* 228)

NEW ENGLAND TAKE A CHANCE?

Hanes' Studio

These scenes in Harvard's Petersham Forest are typical of the fire hazard which followed the great storm. This tangled debris, thoroughly dry, would provide fuel for fires of tremendous intensity, against which New England must have organized protection

Minnesota Tourist Bureau

What lure is there to the open road when beauty is surrendered to the maker of charred and tortured landscape?

OUTDOOR RECREATION---GONE WITH THE FLAMES

By ARNO B. CAMMERER
Director, National Park Service

CARELESS men, seeking the pleasure, beauty and healing peace of vacations in America's great forests, have destroyed millions of acres of these forests for all time. They have dropped lighted matches or half-burned cigarettes or left a glowing campfire to be fanned by the wind from a companionable blaze into a roaring devil of destruction. These men had had their fun, *their* vacations were over—they didn't stop to think about the wildlife that lived in the woods, or of the cool, green forest itself, or of the "other fellows" who might like to vacation there next week or next year.

They "didn't mean to do anything wrong." They "wouldn't harm a thing." But what they did to the forest was murder. Where there had been beauty, there are now blackened, charred stumps, naked, tortured, twisted tree branches. Where there had been pleasure, there is now pestilence—insects and disease eating out the hearts of the burnt hulks, and erosion destroying the now unprotected earth. Where there had been peace, there is now a new quiet,—the quiet of death and stagnation.

And yet there are ever-growing thousands of "other fellows" who would like to vacation in the woods. What are they to find?

There were vast forests in this country when the pioneers arrived. Much of their acreage was necessarily cleared for agriculture and urban development. More was cut for lumber. But lumbering alone seldom permanently destroys the forest, since

nature makes heroic efforts to replace the trees removed. Fire and its consequences are the major causes of loss of forests usable for recreation.

In this presumably civilized and progressive country of ours, it is estimated that an average of over 50,000 fires have been caused each year by careless smokers and by campers or picnickers who fail to extinguish their fires. Over thirty per cent of the total number of fires are traceable to these two causes. Of course, all of these cannot be laid at the door of the recreationist but a large enough proportion can be directly traced to this class of user to warrant serious consideration.

During the five-year period, 1933-37 inclusive, an average of over 40,000,000 acres of once beautiful and useful area were blackened, wildlife destroyed, streams polluted, erosion accelerated, camp sites and picnic areas ruined, scenery made desolate or uninteresting, property values and sources of income for local people decreased, even human lives lost—largely because of carelessness with fire and lack of adequate protective facilities.

Among the direct effects is the posting against trespass of private forest lands to prevent their public recreation use. The private land owner cannot afford to risk the public's threat to his property and investment.

On the one hand, we decry the exploitation of private forest areas and the cutting of forests without provision for the regeneration of future forests, while on the other, the public makes conditions impractical for continuous forest production by making protection exceedingly expensive.

Due to this restriction on use of private lands, it is inevitable that the demand and need for public recreation areas will be greatly intensified.

How are we to conserve adequately the forests of America for recreation use and prevent this continued loss of actual or potential recreation area? How are we to conserve for use, when it is careless use that destroys?

For years intensive education, appeal and warning to the public, and demonstrations of the destructive results of fires have been used. These methods of approach have been effective to the extent that the number of fires started by the public has not increased in proportion to the increase in number of people using the forest recreation areas. This is encouraging and fortunate since millions of people now use the forest highways, trails and recreational facilities where, a decade ago, there were only hundreds or thousands. However, the number of man-caused fires continues as a real and ever-present threat. The campaign must continue and new approaches must be devised. There are many indications that the recreational public is becoming fire-conscious. We must make it even more so.

Occasional fires caused by carelessness are apparently inevitable and there are many other dangers,—from lightning, incendiarism, debris burning, lumbering operations. Increased protection personnel not only for public contact and prevention but also for suppression purposes, more protection through physical improvements and reduction of fire hazards, strengthening of regulations regarding smoking and the use of fire in the forest, and more and better fire fighting equipment appear to be the only insurance for safeguarding our outdoor recreation areas in the forests.

The national parks and monuments, with 7,000,000 acres of forest, had over 12,000,000 visitor-users during the past year. Only thirty man-caused fires occurred, as against 113 from lightning. This speaks well for

Forest Service

Man surrenders not only natural beauty and playgrounds but also improvements for their use and enjoyment when the red demon stalks the forest. Scene of a burning camp in the Pacific northwest

Forest Service

Gone with the flames is this paradise for motorists in northern California. Once shaded by towering pines, restful and healing, a place to stop and dwell awhile, as shown at left, now is a road of desolation, as shown at right. Where there had been beauty, there is now blackened, twisted tree trunks; where there had been pleasure, there is now the quiet of death and stagnation

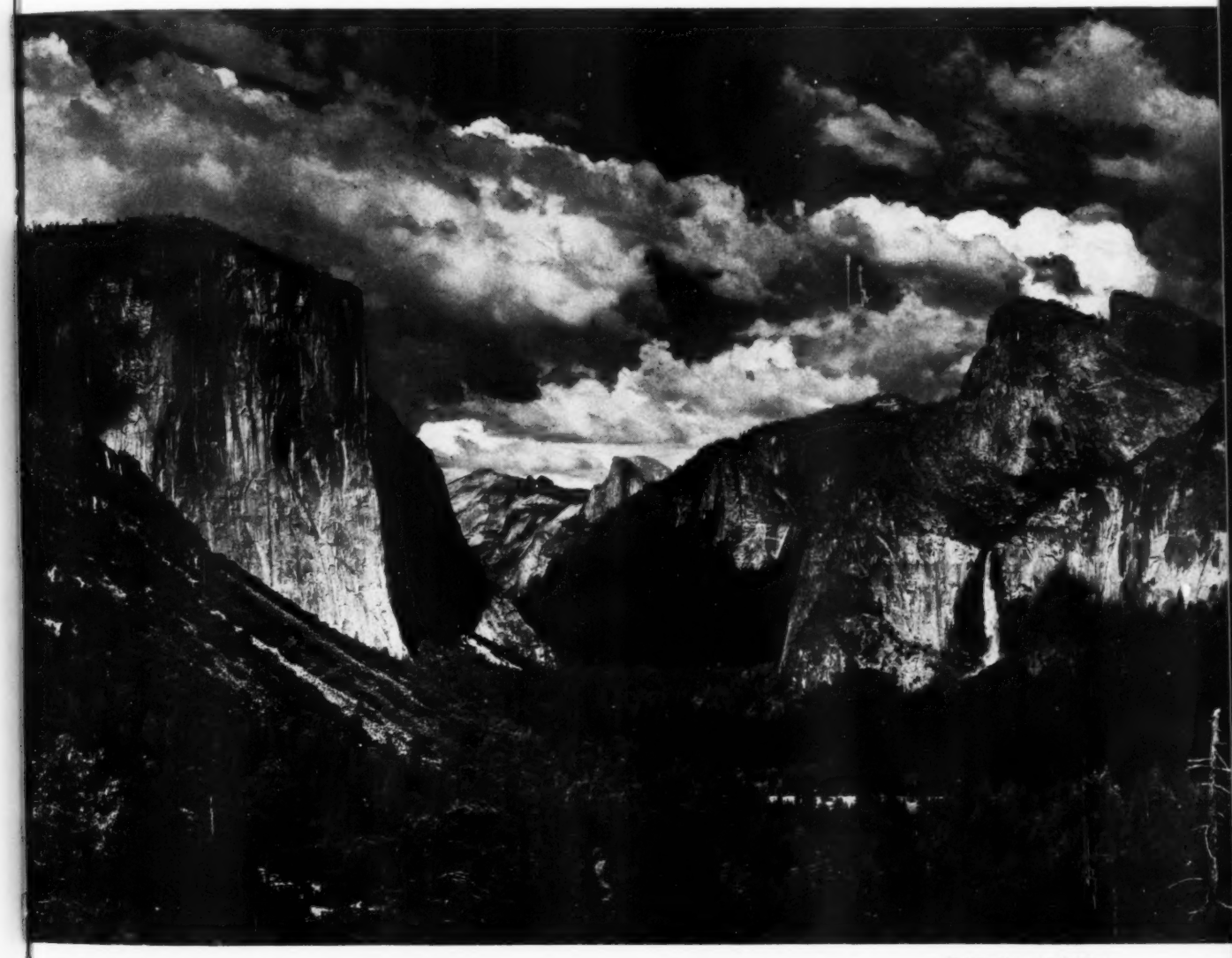
Frank W. Childs

What forest fires, if not prevented, do to the scenic treasures which the National Parks are created to preserve is vividly portrayed by this photograph taken shortly after the 1936 fire in the Isle Royale National Park. The fire, reported as started by a careless camper, laid waste one fourth of the park area

the park public's respect for fire prevention and for the park rangers' protection endeavors.

For several years, the service has concentrated on trying to reach visitors with carefully worded warnings, cautionary publicity, practial but not too stringent restrictions on smoking and campfires in areas of special hazards, and friendly contacts by patrolmen, rangers, and naturalists. The public response has been encouraging and gratifying but complete protection from man-caused fires is not obtainable by these means alone. In spite of all our efforts in several areas of the system, real destruction of scenic and recreational areas has continued from man-caused fires. Without other provisions, more losses may be expected. Every fire that starts is a potential conflagration which can be stopped only by well trained, efficiently equipped, capable and quickly available suppression organization.

The conflict of objectives between preservation of natural wilderness areas free from roads, trails, structures and facilities, and the need for prompt attack on all fires, creates a problem of relative values. Bringing mankind to the wilderness results in raising the fire danger above the normal, primitive level. Accordingly some means must be provided of counteracting these human encroachments and of preventing abnormal damage to those factors of mature forests that help to make the wilderness attractive. A fire can, through delay in reaching it, quickly accelerate into conflagration proportions and impair the natural recreation values of the area. A carefully weighing of risks against protection needs must dictate the reasonable minimum of protection safeguards. (*Continuing on page* 230)



Photograph by Ansel Adams

No nation offers so much in outdoor recreational opportunities as does America. Yet no nation endures such reckless destruction of recreational resource by fire. And while the firebrand has not as yet touched this green valley in Yosemite National Park—it can and will whenever vigilance gives way to carelessness

Harry B. Rieseberg

An unusual photograph of a deer and coyote trapped by the encircling flames of the forest fire that swept over the Santa Monica Mountains of southern California last fall

BURNING WILDLIFE

20,000,000 Acres of Wildlife's Domain Are Burned Annually

By IRA N. GABRIELSON
Chief, U. S. Bureau of Biological Survey

WE HAVE all seen motion pictures showing herds of deer, flocks of birds, mountain lions carrying their kittens, bears, bobcats, men, women and children, all hustling to safety from the roaring flames of a forest fire. Their normal fears and distrusts are forgotten in the presence of a greater peril, and they always manage to escape and live happily ever after. That represents the Hollywood notion of a forest fire.

Forest rangers and wildlife surveyors who have to write their forest fire script according to the facts as they find them give us a different picture of what happens to birds, beasts, and fishes when fire sweeps their natural habitat. Their stories of great woodland conflagrations never have happy endings. Forest fires, whether in the East, West, North, or South, destroy the homes of the wild creatures and they always take a tremendous toll of life.

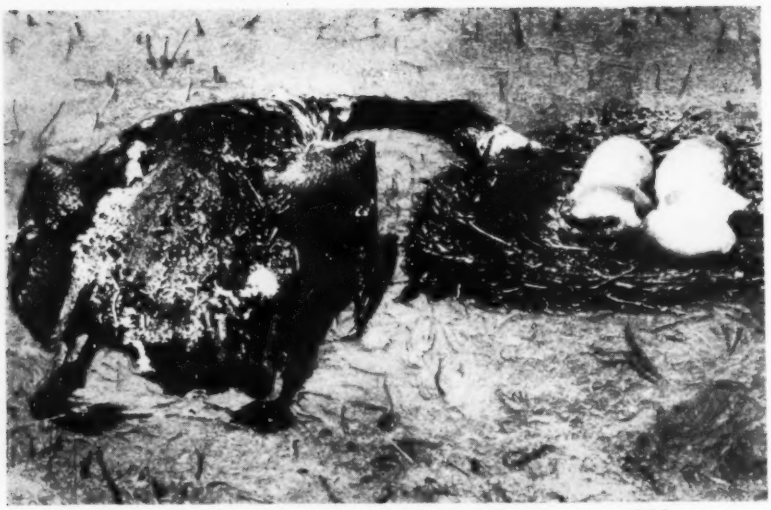
Much has been written concerning the catastrophes in the West and Northwest in the dry years of 1910, 1919, and 1931, the 1918 holocaust in Minnesota, and the serious brush fires in California within recent years. Newspapers gave vivid accounts of terror-stricken wildlife forms fleeing before the common enemy, of lakes and streams buried in ashes, of fish life and other aquatic creatures literally boiled and suffocated by the conflagrations. The instinct of wild animals to drift back to their "homing" grounds often leads to their destruction. It would seem that birds and mammals, fleet of wing and foot, could take care of themselves, but in the roaring confusion of fire, the heavy pall of smoke, the blast of the flames, it is no wonder that thousands of creatures try to return to the places where they have always found safety from other enemies in the hope that the home grounds can also protect them against this new danger.

Fire damage is not confined to upland wildlife species; it is one of the major influences now retarding the waterfowl restoration program in this country. Ducks, geese, and shorebirds must find nesting places in the grass and other vegetation growing along the shores and on islands. Frequently these nests are a mile or more from the water's edge. Such nesting areas, in unnumbered thousands of acres, are fired each season to improve the pasturage for livestock. Whether this practice helps the pasturage or not, it certainly ruins all the nesting sites of waterfowl and other birds in the area. It is customary to do this firing of dead grass areas adjacent to marshes just at the time when waterfowl, prairie chickens, sharp-tailed grouse, pheasant, and quail

Michigan Department of Conservation

Conservation of wildlife and preservation of the great American sport of hunting depends first and last upon protecting the natural habitats, food plants and breeding grounds, without which birds and wild animals cannot live. Above—A sportsman's paradise in the Lake States. Below —A similar area, rich in cover, now—gone with the flames

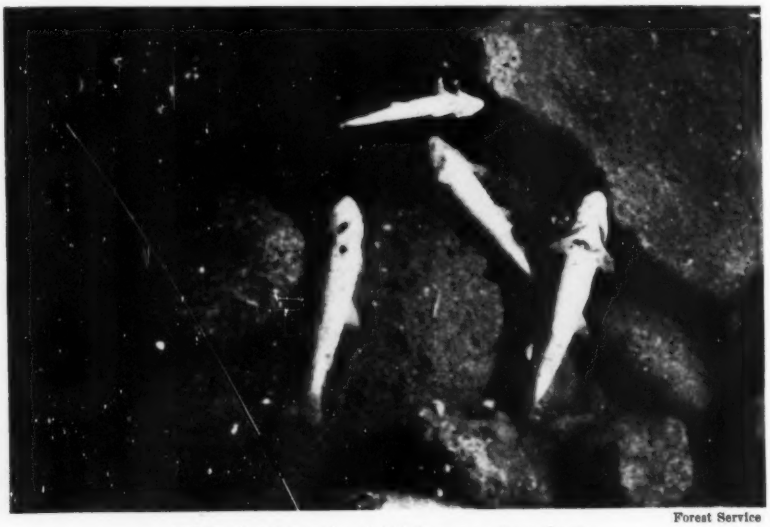
Minnesota Tourist Bureau



A gruesome but common record of what fire does to wildlife. This wild goose died in vain to protect her nest and potential young

Forest Service

And this fleet-of-foot buck could find escape only in a singeing death



Forest Service

While heated and ash-filled waters brought to an end the fish life of this mountain stream

are nesting. There is no reason why the annual burnings on western marshes and irrigation projects could not be postponed for the few weeks required to allow the birds to hatch and bring off their young. As now practiced, it is another striking example of our muddle headed eagerness to throw away something of real value in exchange for imaginary benefits which seldom materialize in fact. Surely there are enough forest fires and grass fires from unpreventable causes to satisfy all our pyromaniacs. We ought to stop this business of deliberately turning the torched foxes loose in our diminishing vineyards.

The annual killing of birds, animals, and fishes by fire is not the most serious damage caused to wildlife by conflagrations of this sort. The destruction of its habitat is an even greater evil because it prevents any recovery of the wildlife population on the burned ground for many years to come. The loss of a year's crop of wildlife in an area is a temporary setback if the area is left in condition to produce another crop. Fire, however, is not a temporary disaster; it burns the crop and it destroys the ability of the land to produce another.

In 1937 a total of over 20,000,000 acres of wildlife habitat was blasted, scorched, and sterilized by forest fires in the United States. This figure does not include grass fires and marsh burns. If these fires killed only one bird or animal to each acre, that would mean a loss of 20,000,000 living creatures burned to death or suffocated in one year. But to obtain an estimate of the total loss we must multiply that figure by the number of years that will elapse before the habitat destroyed in 1937 has been restored and is ready once more to produce maximum crops of wildlife. Bird and beast alike know that they must shun a burned over forest until nature has healed the wounds. In dry areas this requires many years.

In all our plans for the conservative management of our lands for wildlife we must recognize the fact that whether kindled in ignorance or maliciously or accidentally, forest fires and grass fires are deadly to wildlife.

ORGANIZING FOR COMMON DEFENSE

By

WILSON COMPTON

Secretary-Manager,
National Lumber Manufacturers Association

Packer John Lookout—last word in modernity in the Sawtooth Mountains of Idaho. It is maintained by the Southern Idaho Forest Fire Protective Association

THE PATTERN of American forest protection is variegated. This checkerboard is a result of the continued struggle by public and private agencies and forest owners against a vast public indifference to the hazard and consequences of forest fires. In recent years this indifference has been crumbling. More people have been going to the forests. The awesome spectacle of forest fire devastation has been more persuasive than pages of authentic statistics on preventable forest fires. But we need better organization; more integration of fire controls; more earnest effort at fire prevention and less need for fire suppression.

The federal government maintains organized forest protection over national forests, Indian timberlands, and national parks. Forests upon the general public domain are protected, if at all, by the federal Forest Service or by the states or by other agencies conveniently located, under agreement with the Department of the Interior. The O. & C. revested lands are protected in part by the CCC and in part by state and Forest Service protective agencies under contract. In general, federal forest protection is financed by small regular appropriations supplemented by larger deficiency appropriations after the event. The CCC is a new agency in forest protection. It is used in part for protection of forest lands from fire. It may construct permanent patrol improvements upon federal, state and private lands. It may act to suppress fires anywhere, at any time, if the need is urgent. It supplements but cannot be assumed to replace the specially trained personnel of public and private agencies to detect fires, suppress beginning fires quickly, direct action against serious fires, or enforce federal and state laws to prevent fires.

The federal government, first under the Weeks Law and since 1924 under the Clarke-McNary Act, has made yearly contributions to expenditures for protection of state and private forest lands. In 1924, it was estimated that the annual cost of protecting such lands throughout the United States would be about $10,000,000. The Act authorized annual federal appropriations of $2,500,000, or twenty-five per cent. It also authorized the Secretary of Agriculture, in his discretion, to contribute up to fifty per cent of the total protection

expenditures of any state, including allowable private expenditures. Congress never has appropriated the full amount of the authorization. Meantime, and largely as a result of a "nation on wheels," the forest fire hazard has increased, not decreased. Today it is estimated that the annual cost of properly protecting state and private forests will be $18,000,000.

State forestry has had its roots in local demand for protection of forests. State forestry departments generally have emphasized protection more than silviculture. They are charged with enforcement of state laws, including, of course, existing patrol statutes and forest practice regulations. Through them are expended the federal contributions under the Clarke-McNary Act. They exercise general supervision over private forest patrol agencies and over local public agencies set up by counties and municipalities.

It is difficult to draw a line of demarcation between state and private protection efforts. In most states, organization for protection of forest lands has grown out of private activities begun by landowners acting together to control the fire menace. Eventually legislatures have been asked to legalize such efforts or even to require such cooperation, to use the state police power to control non-cooperators, and to contribute funds obtained by taxation.

Methods of integrating public and private forest protection effort vary from region to region. In the Northeast, there is little direct expenditure by owners for forest protection. They may contribute to quasi-public organizations whose objectives are aid and encouragement to state authority. But protection long has been considered and administered as a public responsibility; and New England and New York have come as close to mastering the forest fire menace as has any group of states.

The Lake States' governments have gone far toward assuming authority and responsibility for protecting state and private forest lands. As a proper measure to facilitate its protection task, certain states, notably Wisconsin, have been experimenting with zoning and other limitations upon the use of forest type land.

Southern states have entered the parade of forest fire protection most notably since the enactment of the Clarke-McNary Act. Small federal allotments plus patrol contracts with a few large forest owners usually have produced the revenues, however inadequate, for beginning state forest protection organization. In time, legislatures have become interested and willing to support adequate state departments, so long as the federal government continues to contribute on a reasonable basis. Attitude in the South generally favors state rather than private or mixed state and private forest protection.

Organized forest protection in the far West dates back to the early days of this century. Serious fires in 1901 stirred collective action by forest owners to protect their property from fire. In 1906, in Idaho, were formed four forest protective associations based on the sensible assumption that intermingled ownerships could gain efficiency and practice economy by setting up a trained organization supported by pro-rata acreage assessment. A logical next step was legislation to enable the state to join with its forested grant lands on a similar basis. Washington followed with an association covering the western half of the state. These five grew to thirty, extending from Montana to California, all cooperating with state and federal forest agencies. A clearing house of method and policy was established in the Western Forestry and Conservation Association, presided over for many years by E. T. Allen of Oregon, who may well be called the father of cooperative forest protection, and who, for many years and in many ways, has fostered the cooperative idea, as between public and industry agencies, in dealing with forestry matters.

The western set-up is most notable perhaps for this inter-relationship of public and private agencies. The protection map of Oregon, for example, shows intermingled ownerships of national forest, national park, Indian forest, public domain, revested railroad grant forest, state forest, private forest belonging to operating companies, non-resident investors (Ohio schoolteachers and others), ranchers and other local residents. Nearly every forested county has its protective association. The federal government has four agencies. The state has its own, and general supervision over all private agencies. What might have been a hopeless tangle of overlapping jurisdictions is spread into a neat coverage by contracts and agreements among the several agencies allotting to each their zones of protection, and dividing maintenance of lookout and transport facilities among them.

E. T. ALLEN
"Father of Cooperative Forest Protection"

Nation-wide forest protection may follow the eastern or the western pattern. In either event, there are a few basic considerations:

1. The cooperative approach, as under the Clarke-McNary Act, has demonstrated its worth. It is founded on a sound, equitable principle. It recognizes the hard fact that fires do not respect property lines. And it works!

2. The way should be left always open for experimentation among the states in search of a system which best meets local needs and conditions and which keeps the fires out of the woods!

3. The future must be

(*Continuing on page* 230)

WHO STARTS THESE FIRES?

By ROY HEADLEY
Chief, Division of Fire Control, U. S. Forest Service

ONE hundred and seventy-two thousand forest fires a year! One hundred and fifty-six thousand of these man-caused. An incredible fact. In pioneer days fire helped to destroy the woods and make tilled agriculture possible. It was, therefore, viewed with favor. But we are supposed to have passed that stage. We have come to realize how priceless our natural resources are and what havoc fires play with them. Still, we have one hundred and fifty-six thousand man-caused fires a year. Most of them small to be sure, but most of them potentially and part of them actually, ruinous to our national assets.

Every year, unfavorable weather picks out a number of these fires at unpredictable places and whirls them into conflagrations devastating to human life, social security, tree growth both young and old, water resources, soil, wildlife resources and the growth that helps to prevent floods. Considering how few fires many other countries have and how easy it is to keep most fires from starting, it is almost unbelievable that we are afflicted with so many forest fires every year.

Everyone studying this subject comes sooner or later to a state of exasperated wonderment. How can it be that so many fires are started?

It *should* be possible to remove this question mark on our national intelligence and do it with speed and assurance. But how? How may the causes, the persons responsible be reached? Where should we direct our attention? Who are the people who start these fires?

Ask a fire control expert to tell you who starts our forest fires and he will begin to talk about incendiaries, smokers, miscellaneous and unknown causes, debris burners, campers, railroads and lumbering operations. These causes are stated in the order of their numerical importance. Incendiaries or intentional burners cause the largest number of fires; lumbering operations the least. Percentages of each of these causes and the one natural cause, lightning, is shown in the chart on page 193. This classification is necessary and useful. It helps somewhat, to know for example, that intentional burners have the dubious distinction of starting the most fires. But as a practical matter, just how far ahead does it get us to know this? Perhaps another form of classification, even if non-statistical, may throw more light on the subject. One might attempt a classification of fires according to the reason involved, or the cause behind the cause as fire technicians put it.

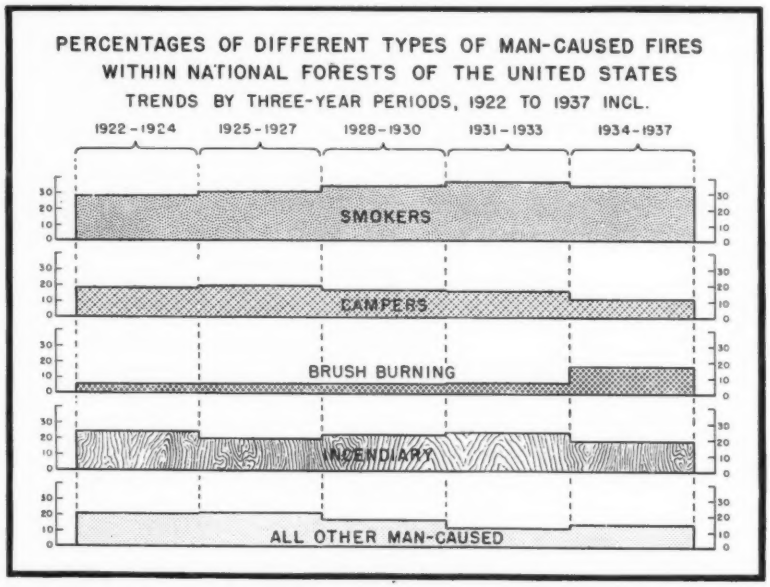
If one were to do this, intentional burners or incendiaries would have to be reckoned with as forest enemy Number One. Not on the national forests where law enforcement has perhaps been more systematic, but for the country as a whole, intentional burners have the discredit of over 42,000 fires in 1937, a relatively easy fire year. Thirteen of the thirty-six million acres burned annually, are chargeable to these intentional fires. The trouble is mostly in the South but no section is wholly free from people who fire the

woods because they want to. Intentional burners are not all alike in motive. A large number have economic reasons for burning. The actual reason may be either real or imaginary. When no feed has been stored to carry cattle through the lean period of the year, they almost starve before the new grass comes in the spring. To burn off the old dead grass enables hungry cattle to get at the new growth a few days sooner. Other grazers are driven out of a range as fire control leads to a dense growth of brush or tree reproduction. To burn off the growth may be the only way to enable stock men to continue to earn a livelihood in the only business they know.

Unemployment is responsible for many fires. Despite all precautions to avoid hiring men to fight fire who may have had anything to do with starting fires, some men will try this chance to earn a few dollars when no other job is to be had.

Where forest protection is weak and fires from any cause are likely to endanger homes, fences and crops, an owner may burn adjacent woods intentionally for the real or imaginary protection he will thus gain for his property from wind-driven fires.

Another large class of incendiary fires are set, not for economic reasons but because of folkways or tradition. There are many people who actually believe that fires will keep out infantile paralysis germs, ticks, chiggers, boll weevil, snakes. There is a deplorable hangover of tradition from pioneer days when fire was the friend of the settler. When father and grandfather believed in woods burning that belief is too often carried along as an inheritance—like political and religious allegiances.



Here's the graphic answer to the question—"Who Starts These Fires?"

In this non-economic group of incendiaries other types of people demand attention. There are the hunters who want the woods kept open to permit easier kills—as long as the game lasts. There are people who cling to the theory that "light burning" when fires do not burn freely, will avoid destruction when winds are high and the woods bone dry. "Light burning" draws some adherents who see in it true forest protection. They are often wholly sincere—and immune to the mass of evidence that the theory is a fallacy. One lumberman, now dead, not only clung to this doctrine, but actually spent his own money freely in the futile effort to make the system work. His sons long since abandoned the costly procedure, but many others carry on the agitation. And even though they start no fires themselves, they supply a theoretical justification for others who want to burn for reasons of their own.

A small but important class of incendiaries is motivated by hatred of society, personal grudge, or general habits of lawlessness.

It should be obvious that there must be the greatest diversity in the media and ideas used to influence these various classes of incendiaries. The line of thought that seems unanswerable to a socially minded banker or teacher leaves a woods-burning stock man cold. The argument, valid in the Gulf States, that if fire is kept out, a crop of pine pulpwood can be grown in twenty-five years means nothing in the Missouri Ozarks where worthless blackjack oak captures soil and light after the virgin stand is cut and the slash burned.

One of the jokes fire control men use to lighten their darker moments is about the many woods-burners who can—and do—make a talk for protection. They know all the words. But still they burn. They have been persuaded intellectually but not emotionally.

One of the grave weaknesses of fire prevention today is that it does not select carefully the ideas which are appropriate for each particular class of persons addressed. When the right ideas are employed they are too often clothed in the wrong words. Talking over people's heads seems to be a common vice in fire prevention as elsewhere.

Thoughtlessness is probably forest enemy Number Two in this non-statistical classification. Thoughtlessness is what controls the well-meaning man who throws a cigarette out of a car window without thinking that he is riding through inflammable material which will be ignited by the cigarette stub. He has been told to be careful when in the woods, but it did not register. He did not think.

Thoughtlessness is behind most of the actions leading to fires caused by campers, debris burners, lumbering operations, smokers and miscellaneous persons. If the man who started the Malibu fire in California last fall by dumping hot ashes in dry grass had stopped to think, he doubtless would not have done it. If the smoker who is supposed to have started the terrible San Antonio Canyon fire had stopped to think, he

doubtless would have been careful with his cigarette. If railroad managers had thought in time about the future revenue to be derived from hauling forest products, mere self-interest would have dictated safety measures that would have prevented much of the devastation to be seen from many railroad lines.

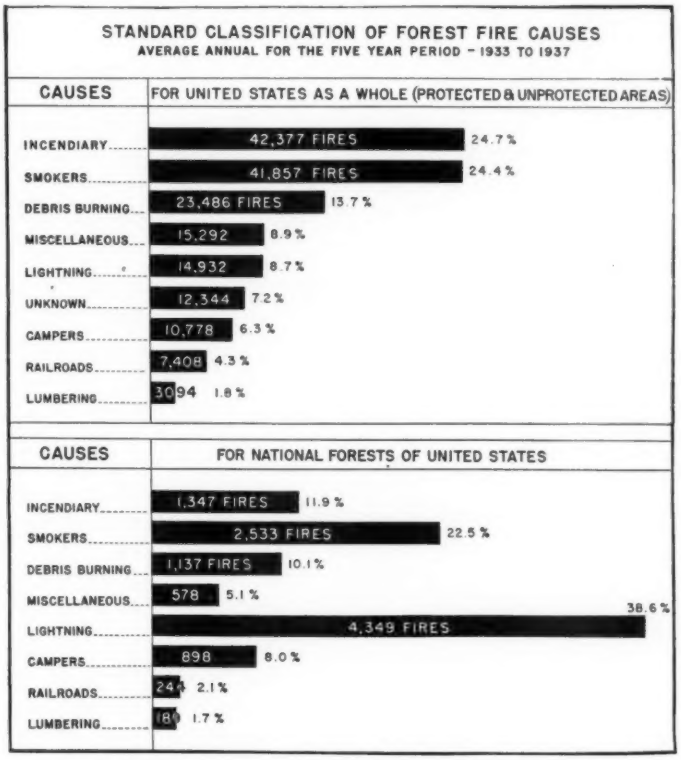
Thoughtlessness may easily prove to be the hardest disease to cure. Sufferers from that affliction are everywhere and too many of them go to the woods. Serious minded social leaders too often neglect to put out their campfires or their smokes—because they do not think. To write a prescription which will cause well-meaning minds and habit systems to respond positively to the messages received by eye and ear is not an easy task. It calls for the best talent in the fields of advertising, adult education and psychology.

Pure carelessness may be next in the order of importance. The careless man may know that a fire may start from the match he flings behind him instead of into the stream into which he is fishing—but he just doesn't care. A railroad executive may know that the coal he is burning sparks badly and may have suffered lawsuits on account of railroad fires—but he doesn't care. Workmen burning brush on a road clearing job may have had experience with wild fires started from brush burning fires, but they may not care enough to make sure that the brush piles they are burning are dead out before they are left untended. There is no sharply defined line between thoughtlessness and carelessness. They often seem the same. And yet there is a difference. A successful prescription for really penetrating the thoughtless mind may not work on the man who does not care. The sort of a jolt which will wash out carelessness may not be appropriate for the man who means well but doesn't think at the right time.

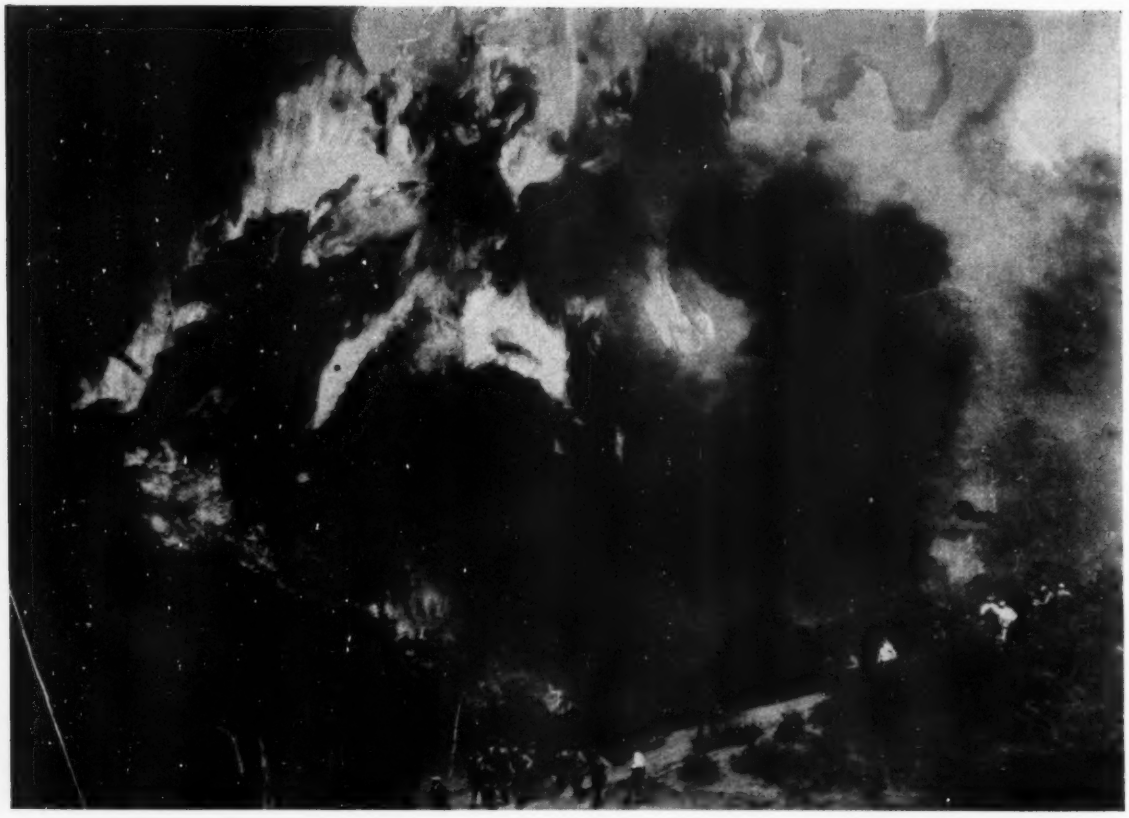
Then there are accidental fires. If no one burned intentionally; if everyone were really thoughtful about fire; if no one were careless; there still would be some man-caused fires. Even with all reasonable safety precautions, logging and industrial activities cannot be carried on without risk of accident including the risk of fire. Well cared for motor vehicles occasionally take fire and set the surrounding forest cover on fire. Stoves in homes will sometimes go wrong and cause fire, first in the building and then in the surrounding grass, brush or timber.

The number of such fires seems greater than it really is to harassed fire control executives who after getting other types of fires well in hand are plagued with what seems to be a run of "freak" fires.

For such truly accidental fires the answer is the same as in municipalities—fire safety precautions. A continual struggle must be waged for better technical specifications and application of fire safety rules. There must be such things as well thought out specifications for buildings and electrical transmission lines; spark arresters for homes, tractors and locomotives; inspection to detect and action to remove inflammable debris from around homes before it is too late. fire-proofing of road and railroad rights-of-way; watchmen around logging and industrial operations and many other measures which will reduce the number of accidental fires. Because of the pyramiding human use of the woods for recreational and industrial purposes, the need for a powerful counter attack is necessary on accidental fires as well as on fires due to thoughtlessness and carelessness. That our notorious fire starting habits can be changed is demonstrated by some of the older national forests in the East. Deep-rooted beliefs in woods burning and a full measure of thoughtlessness and carelessness in dense populations have been transformed into respect for the forest and effective fire safety habits. These pioneering transformations have been slow because they were pioneer efforts. But they prove what can be done even by slow blundering methods. They prove that a whole nation of communities can be led to appreciate the forests and hate fire with an effective hatred.


STANDARD CLASSIFICATION OF FOREST FIRE CAUSES
AVERAGE ANNUAL FOR THE FIVE YEAR PERIOD - 1933 TO 1937
CAUSES
FOR UNITED STATES AS A WHOLE (PROTECTED & UNPROTECTED AREAS)
INCENDIARY 42,377 FIRES 24.7%
SMOKERS 41,857 FIRES 24.4%
DEBRIS BURNING 23,486 FIRES 13.7%
MISCELLANEOUS 15,292 8.9%
LIGHTNING 14,932 8.7%
UNKNOWN 12,344 7.2%
CAMPERS 10,778 6.3%
RAILROADS 7,408 4.3%
LUMBERING 3094 1.8%
CAUSES
FOR NATIONAL FORESTS OF UNITED STATES
INCENDIARY 1,347 FIRES 11.9%
SMOKERS 2,533 FIRES 22.5%
DEBRIS BURNING 1,137 FIRES 10.1%
MISCELLANEOUS 578 5.1%
LIGHTNING 4,349 FIRES 38.6%
CAMPERS 898 8.0%
RAILROADS 24[illegible] 2.1%
LUMBERING 18[illegible] 1.7%

And the "guilty ones"—identified and graphically charted



MEN AGAINST THE FLAMES

By F. A. SILCOX
Chief of the U. S. Forest Service

Photographs by U. S. Forest Service

This article describes briefly developments in forest fire control as applied to national forests, and state and privately owned forest lands in continental United States; some results attained; and certain limitations and needs confronting organized private, state, and federal efforts to control a scourge, largely man-caused—that is one of the most urgent and fundamental problems in the conservation of natural resources. — Editor.

A FEW years after the national forests were transferred to the Department of Agriculture in 1905, a forest supervisor and his deputy, seeing the smoke of an unreported forest fire, traveled for a week in northern California with saddle and pack stock—and with a guide during the last two days—before reaching the fire. Such were the conditions in many forests at that time. There were virtually no fire lookouts or telephone lines. Radio was unknown. Roads seldom reached far into a forest; where they did, no man had ever seen an automobile on them. The term "truck trail" had not been coined. Horse trails, mostly unimproved runways, were patrolled at infrequent intervals by guards equipped with ax, shovel, flour, bacon and beans. Maps were often inaccurate or lacking. Man-power was scarce, inaccessible, unorganized. But weather conditions were relatively unfavorable to forest fires, as they had been since about 1889, and the forest supervisor, deputy, and guide previously mentioned were able to put out their fire before it had covered more than 100 acres.

It was not until 1910 that fire danger, assuming explosive characteristics, disclosed the magnitude and difficulty of protecting forests from fire under American conditions. Those conditions have since been made familiar by intermittent similar "bad" years. One occurred during each of the half decades from 1915 to 1924; two occurred in each of the half decades from 1925 to 1934.

In 1910, forest fires burned over nearly 5,000,000 acres on the national forests. Damages exceeded $24,000,000. In Montana and northern Idaho—where I was

then regional forester—there are whole graveyards consecrated to men who faced the flames and lost their lives fighting forest fires in that tragic year.

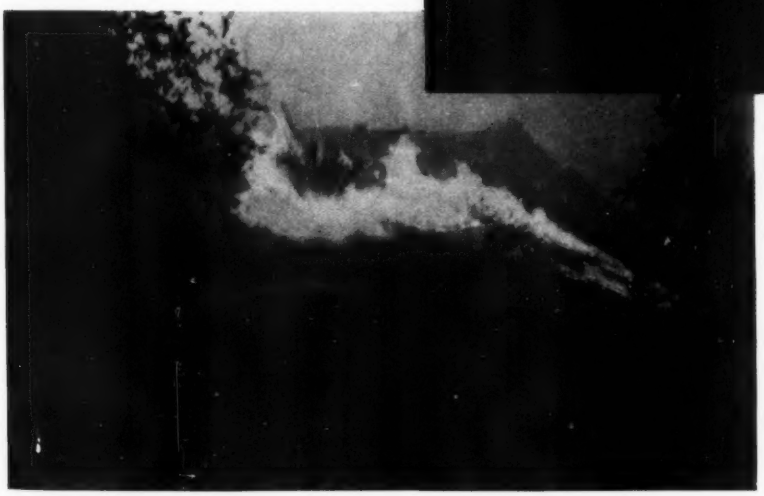
These disasters made it painfully apparent that unless it could be controlled fire might prevent the practice of forestry in the United States. And the increase in frequency of extreme years, and losses in those years—almost sixty per cent of the national forest area burned from 1910 to 1934 was burned during the seven "bad" years of 1910, 1919, 1924, 1926, 1929, 1931, and 1934—have demonstrated that preparation and organization must be predicated on the need to meet conditions occurring in "bad" years.

Since 1910 many difficulties have been encountered in developing national forest fire control. One has been the increase of from 176,500,000 acres to 207,000,000 acres in area under protection by the Forest Service. A second has been the enormous increase in human use: from 4,600,000 visits to national forests in 1924 to nearly 14,500,000 in 1938. But with continuous improvements in fire prevention the increase in number of man-caused fires per million acres protected has—as shown by chart on page 6—been small compared with the increase in human use.

This is encouraging. So is the record of national forest area burned in relation to expenditures. The acreage burned per million acres under protection—see lower chart on page 6—has been forced down and this downward trend is almost in direct proportion to the increased funds which have been made available for fire control. In itself this is a striking indication of progress made. As times goes on the curves shown in this chart will—with adequate funds—tend to flatten out, and with the loss curve down to what might be called an acceptable maximum the fund curve can then be leveled off except for relatively minor fluctuations in exceptionally "bad" years. But the point beyond which it probably will not be worth while to reduce fire losses has not yet been reached.

The following highlights indicate some of the techniques and methods now used in each of the natural three-way divisions — prevention, presuppression, and suppression—of national forest fire control. Most man-caused fires are due to carelessness and neglect. Since it should be possible to eliminate them, prevention is the first step in forest-fire control. In this effort—now planned and budgeted—more and more attention is being given to personal contacts between forest officers, the resident population, the summer visitors. In many sections specially trained law enforcement personnel has proven effective. Backed by sociological and psychological studies, sustained educational campaigns are carried on locally, regionally, and nationally. Visitors to many national forests may be registered during the fire season, and required to equip themselves with simple fire fighting tools. During dangerous periods and in dangerous localities campers may be required to use fireproofed campgrounds only, and to smoke only at places specifically designated. Travel may be regulated or prohibited in certain areas for short periods during extremely bad conditions. And every effort is made to apprehend and prosecute persons who start forest fires.

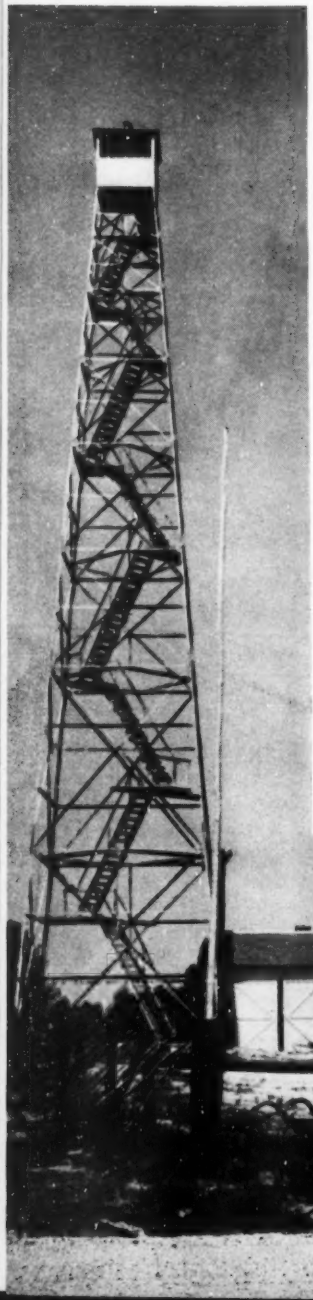
Presuppression, the second step in modern fire control, encompasses the whole field of preparedness. It includes, for example, complete rechecking of fire control planning, and preparing and revising maps, visibility coverage from lookouts, transportation and communication systems, fire weather forecasting, fire-danger rating systems, organization charts, and cooperative agreements. Presuppression also covers adaptation and development of suitable equipment, most of which now



Barring natural causes, such as lightning, most forest fires result from carelessness and are therefore preventable. But once a spark has been kindled, a far-flung fire fighting organization, thoroughly trained and equipped, takes up the battle with high hope — men against the flames

om their towers (below) lookouts discover and report fires (above)

A system of forest truck roads enables men to be rushed into action



tends toward mechanization. Fire suppression is the battle for which all this preparation is made. The protection policy calls for fast, energetic and thorough suppression of all fires in all locations during all possible dangerous fire weather. The objective demands control within the first work period, or before 10 o'clock the next morning. There are certain basic principles of attack. The first requirement is usually to learn the size of the fire and determine its probable progress by prior knowledge of topography, type of cover, wind conditions, dryness of litter, natural fire breaks, etc. Next comes the job of building the fire line. Backfiring is used only with thorough experience and sound judgment. The line is carefully and continuously patrolled, and no fire is left until it is dead out.

No account of fire control would be complete without mention of the Civilian Conservation Corps, for it has made memorable contributions within this as well as other fields. Records reveal that, from April 1933 through May 1938 this organization has put in 543,000 man-days on fire prevention, 3,000,000 man-days on presuppression, more than 4,000,000 man-days on fire suppression. And in 1937, fifteen out of the twenty men who died on far-flung national forest fire lines or from injuries received on them were members of the Civilian Conservation Corps.

National forests now include some 175,000,000 acres, net. There are, however, about 423,000,000 acres in state and private ownership that also need fire protection. This includes three-quarters of the best of all our commercial forest land in the continental United States.

Forest fire control on private lands in America began in colonial times. The principle of centralized direction was enunciated in New York and Colorado in 1885. Records indicate a meeting of a Pacific Northwest Forest Protection and Conservation Association in 1909; of the Western Forestry and Conservation Association in 1910. In 1911 private owners organized the Oregon Forest Fire Association, representing about 2,000,000 acres. In the same year—by the so-called Buchanan Forest Fire Bill—it became a state function in Oregon—as it now has in most states—to protect state lands and help private owners protect theirs.

The federal government first assumed responsibility in fire control on state and privately owned lands by the Weeks law, passed on March 1, 1911. This enabled the Forest Service to cooperate with the states in the protection of watersheds of navigable streams. In 1912 five New England states plus Pennsylvania, New York, Maryland,

Mules, too, are brought up, to pack supplies and equipment to remote areas

Fire camps are established where fire fighters rest and are fed

While radio stations are set up to report progress of the battle

Wisconsin, Minnesota and Oregon, were engaged in systematic prevention and control of forest fires on 60,779,000 acres. The number of states increased to twenty-six and the area protected to 172,653,000 acres by 1923, when the South—Louisiana, North Carolina, Tennessee, Texas, Virginia, and West Virginia—was represented.

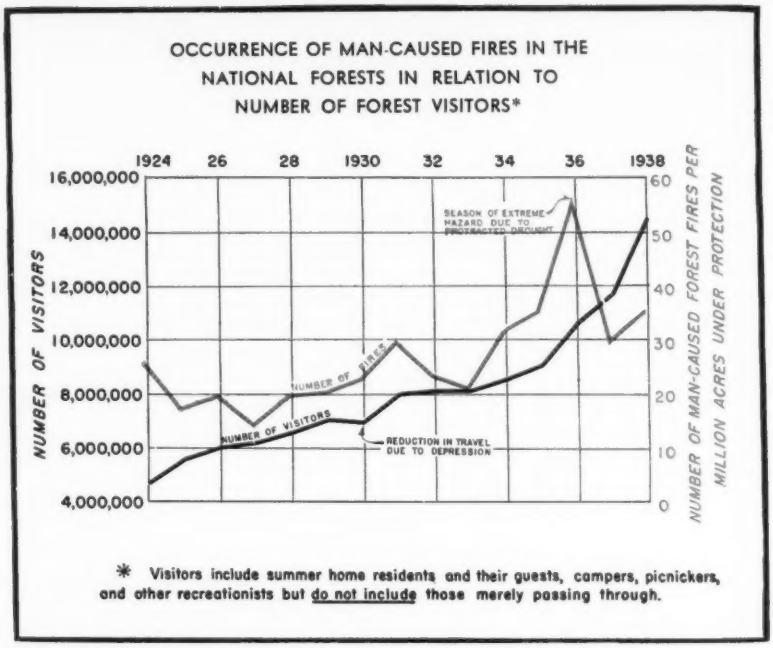
On June 6, 1924, the Clarke-McNary law extended possibilities for cooperative activities to all forest land in state and private ownership, and to non-forested areas having watershed values. The number of cooperating states and territories, forty-one in 1938, includes practically every state having forest fire control problems on state and privately owned land. Total area protected in 1938 was 258,000,000 acres. That unprotected was 169,000,000 acres.

Evolution of techniques runs the gamut from casual detection, then beating out of fires with pine tops, to systematic detection, communication by wire and radio, stand-by crews of firemen and motorized equipment. Protection of the "pinetop" order is still in existence but there are now some 2,000 state lookout towers, thousands of miles of telephone lines, hundreds of radio sets, and up-to-date field headquarters. There are also tank trucks in California, water holes and pumps in the Northeast, heavy fire-line machines in the Lake States, and light hand-tool trucks in the South.

But although real progress has been made there are approximately 169,000,000 acres in state and private ownership still outside organized fire protection districts. And although on protected areas performance was excellent within some states, it is not yet adequate within many organized districts within a number of states. These conditions are reflected in the record for the five-year period 1933-1937. It shows one per cent of the *protected* area burned over each year, but sixteen and one-half per cent of the *unprotected* area burned over yearly. Total area burned on protected and unprotected state and private lands within this period is estimated at 35,000,000 acres.

The first federal appropriation under Clarke-McNary was made in 1926—$660,000, with $638,427—expended for this purpose. Recorded public funds expended for organized fire protection by the States reached $1,611,380 that year. Those reported by private owners were $263,512. Of the $2,513,320 total, expenditures by private owners therefore constituted ten and one-half per cent; those by public agencies eighty-nine and one-half per cent. In the fiscal year 1938, expenditures by States were $4,013,876. Those authorized under the (federal)

Up against the flames—putting through a fire line. . . . At right, a rescue



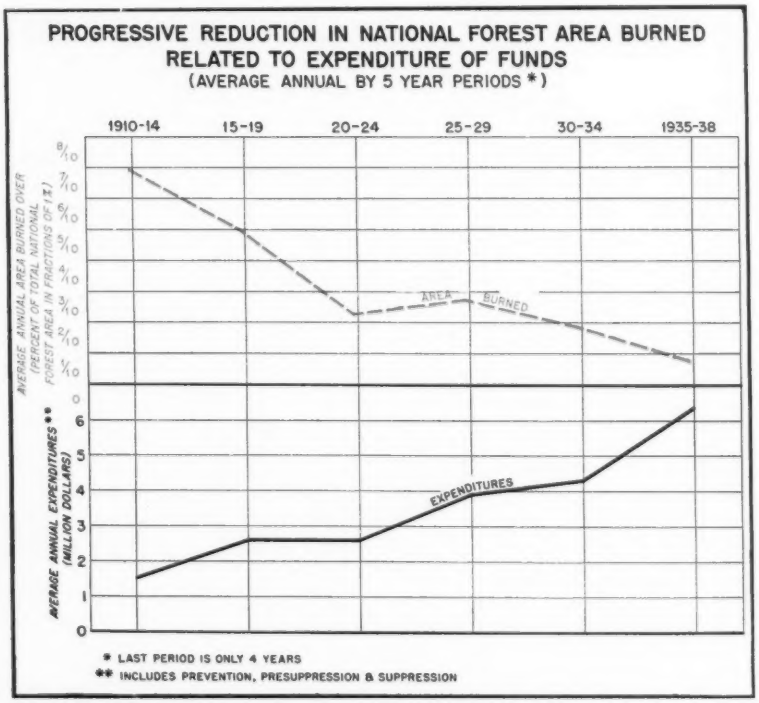
Man caused fires are increasing with growing public use of the forests for recreation. Greater public participation in prevention is needed

Clarke-McNary law were $1,610,000. Those reported from private owners $1,433,671, or about twenty per cent of the total. There were additional unreported private expenditures, and the public expenditures mentioned do not include fire-protection work done by the Civilian Conservation Corps on private and state-owned forest lands. The major objective in cooperative fire control on state and privately owned lands is to extend adequate protection to the entire area in need of it, and to intensify protection of areas on which current protection is still inadequate. The federal authorization under the Clarke-McNary act is still what it was in 1924—$2,500,000. The total amount budgeted for the fiscal year 1939 is approximately $9,500,000. This indicates a major limitation and a major need, for reasonably adequate fire protection for all these lands may require $18,000,000 annually. This calls for increases in federal as well as in state and private expenditures.

But additional funds is not the only need, nor is lack of them the only limitation. There is need, for example, for more study and research in the technology of fire control; for more effective fire law enforcement; for strengthening state legislation; for some adequate solution of the short-term guard situation: one that on national forests now involves an average annual turn-over of thirty-three and one-third per cent and inability of many of the guards to secure jobs when not employed by the Forest Service. Lightning sets forest fires but most of them are man-caused. And although most man-caused fires are the result of carelessness, an appreciable percentage are intentionally set. Man-caused fires constitute, therefore, a serious problem: one in the solution of which progress has been made, but one within which additional progress should be possible through the Advisory Council on Human Relationships recently created by the American Association for the Advancement of Science.

Here, then, is a challenging problem. Solution of it is inextricably bound up in the need to find some economic solution for local populations dependent upon forest lands for their livelihoods.

This is the key to our forest problem. And since forest lands in the United States perform services and have values that are far greater to 130,000,000 of people than to the few thousands who now own most of the best of them, these lands and their resources must be managed—as well as protected—so that they contribute the maximum to social and economic structures, thus helping to underwrite a permanent and a more prosperous civilization.



Forest fire losses to the nation have been reduced, but only at the cost of greatly increased expenditures. Prevention is good economy all around

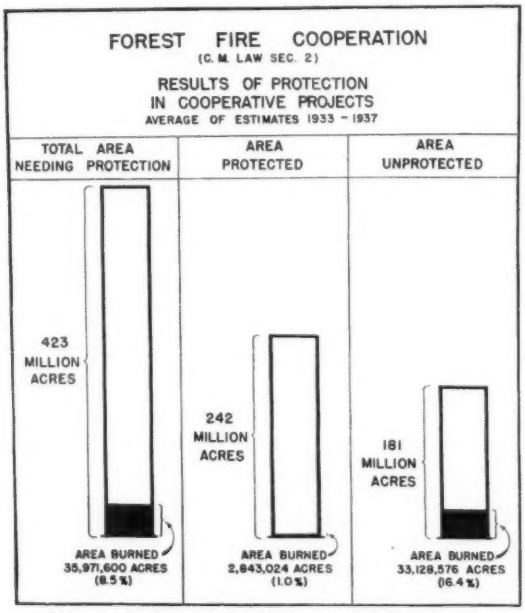
FOREST FIRES--CHALLENGE TO FEDERAL LEADERSHIP

By

CHARLES L. McNARY

United States Senator from Oregon

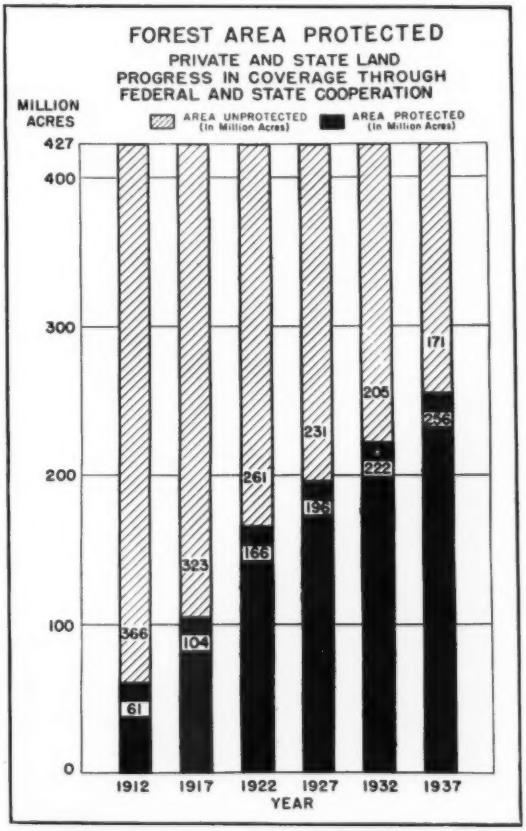
FOR almost forty years the conservation of natural resources has been a declared policy of this country. Our people have supported the policy with increasing unanimity as the exhaustion of renewable resources and the need of restoring them have become increasingly apparent. They rightly have looked to the federal government to take those measures that would lay a national foundation upon which the states, communities and individuals with assurance of success could base local policies and engage in conservation activities that would safeguard natural wealth and community welfare.



This graph shows strikingly that organized protection pays. Note that of the area receiving protection, only one per cent is burned annually as against more than sixteen per cent for lands unprotected

Upon this broad premise Congress has written many conservation acts in the federal statutes pursuant to which the federal government has spent billions of dollars of public funds for the conservation and development of natural resources. It has created and placed under administration national forests, parks and wildlife reservations. It has brought the public ranges under control. It has attacked the problems of flood control and soil erosion. It has engaged in research and education on a broad scale. It has given financial aid to the states. In brief, it has extended its expenditures into virtually every field of conservation.

Its leadership, commendable though it has been in many directions, has, however, failed singularly in one very fundamental respect. This is in the matter of providing adequate protection against fire for state and private lands, which comprise better than eighty per cent of the nation's forest resources. The failure is self-evident in the fact that today after four decades of conservation spending some 172,000 fires yearly continue to lay waste great areas of our land, destroying the natural wealth inherent in them and making temporary at best man's efforts to conserve and develop them. Over sixty per cent of these fires are occurring on unprotected state and private lands.



After twenty-five years, organized protection against fire has been provided for only a little more than half the nation's forest lands. To provide protection to the remaining 171,000,000 acres, the author declares, is conservation's challenge to federal leadership

No nation can acclaim itself as on the road of permanent conservation as long as 172,000 fires every year are eating at its soil, destroying its timber and wildlife, polluting its streams, curtailing its recreational outlets and setting into action agencies of erosion and floods. Nor can it view with safe complacency and without sense of responsibility great expenditures of public and private funds for conservation work when those expenditures may be rendered useless over night by the ravages of uncontrolled fires.

It has long been the national view that wise management of our forests and related resources carries with it a responsibility on the part of government to help protect both private and public resources and investments made for their conservation and use. This view is written into our national laws. In the early 1920's the Senate of the United States appointed a committee of its members to study our forest problems and to recommend to the Congress such supplemental legislation as then seemed proper and necessary to give more foundation substance to a national forest policy. The committee visited every important forest region of the country and gave long and earnest study to the basic needs of national conservation. As chairman of this committee, I introduced in the Senate a bill which was later passed by the Congress in 1924 giving legal effect to the findings and recommendations of the committee.

JAMES MONTGOMERY FLAGG

The American Forestry Association on March 22 unveiled for the first time its new forest fire prevention painting by the celebrated illustrator James Montgomery Flagg. From this painting a million colored posters will be reproduced and distributed throughout the country by cooperative action of the United States Forest Service, state forestry agencies and conservation organizations. Mr. Flagg is here shown with the painting, which is reproduced on the cover of this issue.

The measure is today known as the Clarke-McNary Act. It is based on two fundamental needs as found by the committee. The first was the clear necessity of providing better forest fire protection for state and private lands in order to safeguard resource principal and to justify public and private agencies in investing time and money in conservation works. The second was the need of extending public forests to embrace those lands of watershed value which private endeavor could not be expected to manage on a permanent timber growing basis.

Recognizing that forest fires are caused in large part by the general public and that their prevention and control is beyond the power of any individual without the organized aid of government, the act opened the door to the federal government to exercise leadership in solving the problem. It did this by authorizing the Secretary of Agriculture to enter into cooperation with the states to establish adequate systems of forest fire prevention and suppression in the forest regions of the country. It further authorized the Secretary to match with federal funds dollar for dollar the expenditures made by the states in organized forest protection. In other words, the act apportioned the responsibility of national forest fire control on a fifty-fifty basis as between the federal government on the one hand and the states and their citizens on the other hand.

Following passage of the act, control of forest fires on a national scale went forward with encouraging prospects of ultimate success. Congress made its first appropriation under the act in 1926 in the sum of $660,000. The states and private owners responded with expenditures of almost $2,000,000. The act has now run for fifteen years and has been the instrument by which organized protection against forest fires has been extended to more than one-half of our forest lands.

Why then has the act not been made operative in respect to those millions of acres still in need of protection and where our greatest (*Continuing on page* 226)

Henry B. Rieseberg

THE AMERICAN FOREST FIRE MEDAL FOR HEROISM

Heroes of Tragic Blackwater Fire of 1937 Are First to Be Honored

HEROISM in forest fire fighting, one of the most arduous and hazardous tasks men are called upon to perform in peace time, is now officially recognized. With the creation of the American Forest Fire Foundation, outstanding valor on the fire line will be acknowledged by the award of the American Forest Fire Medal for Heroism.

First to receive this recognition are three men whose heroic acts saved the lives of forty CCC fire fighters during the tragic Blackwater fire on the Shoshone National Forest, in Wyoming, on August 21, 1937. They are: Urban J. Post, of Buffalo, Wyoming, a forest ranger assigned to the Bighorn National Forest; Bert A. Sullivan, of Cody, Wyoming, a temporary employee of the Bureau of Public Roads; and Paul E. Tyrrell, of Oakland, California, who as forestry foreman of a CCC camp at Tensleep, in Wyoming, lost his life in the Blackwater disaster. Ranger Post was awarded his medal and citation at The American Forestry Association's national forest fire prevention dinner at Washington, D. C., on March 22. At the same time Representative Albert E. Carter, of California, accepted the medal for Mr. Tyrrell's family. Mr. Sullivan will receive his award in Wyoming at a later date.

For Heroism

Tangible recognition of heroism in forest fire fighting has long been the dream of many conservationists, but it was not until the Blackwater fire that the idea took definite form. Before the smoke had cleared on that fateful August day a small group of foresters were at work translating a vision into something which will become a part of the traditions of American forestry—the American Forest Fire Medal for Heroism.

From the efforts of this small group, the American Forest Fire Foundation was created. A special Board, made up of representatives of five national organizations concerned with forest fire

(*Continuing on page* 240)

CALIFORNIA PAYS THE RED PIPER

By E. W. MURPHY
Statewide Conservation Chairman, California State Chamber of Commerce

ONE hundred and forty-six years ago Jose Joaquin de Arrilaga, then Spanish Governor of California, issued a proclamation forbidding the setting of fires and sent it with a letter to Father Presidente Lasuen. His letter said: "As a result of the various complaints that have come to me regarding the damage done by the fires that the Christian Indians and gentiles start every year in the pastures . . . I am convinced of the damage and have set penalties which will frighten them with the severity of justice." He also offered rewards to the officers of the guard and the Indians if they would fight these fires.

Neither the rewards nor the severity of justice were enough to keep forest and range fires out of southern California. Or perhaps the Mexican regime had changed the laws of the Spanish administration, for in 1835 Richard Henry Dana visited Santa Barbara and gives this account of a fire in his classic, "Two Years Before the Mast." He said: "The town is finely situated with a Bay in front and an amphitheatre of hills behind. The only thing which diminishes its beauty is that the hills have no large trees on them, they having been all burnt by a great fire which swept them off a dozen years ago, and they have not grown again. The fire was described to me by an inhabitant as having been a very terrible and magnificent sight. The air of the valley was so heated that the people were obliged to leave town and take up their quarters for several days on the beach."

These two incidents, and they can be readily multiplied, bring out two facts regarding California and the Red Piper. There have been large forest and chaparral fires since earliest historical times and these fires have been intense enough to do great damage. Scientific research has made it certain that California has had forest fires for two thousand years and perhaps longer. A giant sequoia cut in the Kings River Grove by the Sanger Lumber Company in the 1890's was examined by the late Professor W. R. Dudley, of Stanford University, and found to be 2171 yars old. Scars on the annual rings showed that fires had occurred in the years A. D. 245, 1441, 1580 and 1797. They must have been severe to have bitten through the bark of those great trees. The record written in the annual rings of the oldest trees for the past 230 years is complete. Dr. E. P. Meineke, of the Bureau of Plant Industry, brought out the fact that occurrence of individual fires was simultaneous over a large area in the Sierra Nevada mountains. This was evidence that there were certain seasons when precipitation was subnormal and

lightning storms were prevalent. There is no doubt that the Indians set some fires but the great conflagrations of prehistoric days covering large areas have been the result of meteorological conditions.

During the period 1870 to 1900 the mountain areas were grazed each summer by sheep and cattle whose owners had comparatively small areas of patented lands or ran their stock on government land without any regulation or control. It was the common practice of the stockmen to set fire to the ranges as they left in the fall. The reports of the first California State Forestry Commission contain accounts of large fires some of which destroyed millions of board feet of standing timber. C. Hart Merriam, chief of the Bureau of Biological Survey, traveled through the Shasta country in 1898 and wrote about fires in that region which burned for a full month while he was there. In describing the smoky condition of the atmosphere which prevented him from seeing for any distance he said: "This experience is frequent in the West and of the hundreds of persons who visit the Pacific Slope every summer to see the mountains, few see more than the immediate foreground and a haze of smoke which even the strongest glass is unable to penetrate."

Evidently there is a combination of conditions in California which cause forest, brush and grass fires; these conditions cause fires to start, spread, and do damage. What are these conditions and why does California have to pay the Red Piper a higher tax than other states? The federal Forest Service uses the word "danger" to cover all items of fire liability. Fire danger is made up from risk, or the chance of fire starting; hazard, the chance of fire spreading; and weather.

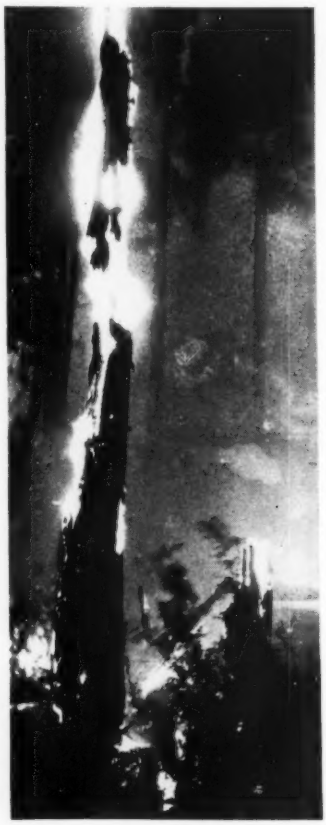
There are only two agencies which set fires, lightning and man. Lightning accounts for about thirty per cent of the fires in the high mountain country of California but for only about three per cent of all the forest fires in the state. California has less lightning risk than some of the states of the Inland Empire. The risk from man-caused fires comes from two main sources—industries and recreationists. The industries are those located in inflammable cover such as grass, brush or forests and engaged in logging, mining, hydro-electric power, grazing, railroads, and construction work of all kinds. The greatest man-caused risk however—and it is probably greater in California than in any other state, is from the recreational use of the national and state forests and parks. Each year there are four and a half million persons who use the national forests of the State for some form of recreation,—hunting, camping, fishing

An air view of the Red Piper on the march through the Santa Monica Mountains last November wrecking the watersheds, one after another, upon which southern California is so vitally dependent

Acme

or picnicking. Over a million and a half enter the national and state parks and monuments. Counting repeaters who go each week-end into the eighteen national forests, four national parks, seventy state parks, seven national monuments and nine state monuments, there are over 30,000,000 people entering annually the recreation areas of the state. These figures for recreational travel in California and use of the forests and parks of the State is half of the total for the entire nation.

Every one of these persons is a potential setter of forest fires. Fortunately where the population is the densest and the danger the greatest there is the finest cooperation with the organized fire protection agencies. Over half a century ago Southern California learned that fires in the chaparral covered watersheds of their mountains made them liable to damage from floods, erosion and even loss of life. As long ago as 1900 Abbott Kinney, in his book, "Forest and Water," advocated absolute fire protection for the irrigationist of the southern coastal basin.



Fire hazards or the chance of fires spreading has to do with the cover on the ground such as grass, brush, leaves, needles and forest litter. One has only to travel the thousands of miles of highways in California through the great valleys with their grain fields or grazing lands, through the chaparral of the foothills or the forest litter of the commercial timber belt to realize the extent of the inflammable cover which might burn if a spark should set it aflame under the right weather conditions.

Officials of the Weather Bureau say that California has a climatic hazard that is longer sustained and a fire danger season that is interrupted by fewer favorable breaks of weather conditions than any other state. There are also the "Mono" or "Santa Ana" winds; currents of air forming in some seasons during the late fall or early winter on the plateau regions east of the Sierra Nevada or north of the Sierra Madre ranges which flow over the summits and attain velocities of forty to seventy-five miles an hour. The slightest spark in the woods or fields is fanned to a tornado of fire. This combination of spark and wind is the cause of severe losses of watershed cover in the southern part of the state. Three years ago one of these winds devastated the foothill region from Calaveras to Fresno County.

In thinking of damage from forest fires we naturally measure it in terms of losses in resources which are usable to mankind. But some of these losses are not immediately evident and have far reaching effect in the future. The value of the fruit crop on irrigated lands amounts to about $200,000,000 annually, and eighty per cent of the water for these irrigated lands depends upon the forested and chaparral covered watershed of the State. In the Los Angeles basin area there are fifty-seven incorporated cities and numerous urban communities in 2200 square miles of irrigable land or land suitable for residential development. Until the Boulder Dam project was completed this part of the State had less than one per cent of the State's water supply. Engineers figure the value of the brush-covered watersheds in this area as being worth from $300 to $500 an acre as a source of water. With the development of the great water supply projects on the Sacramento and San Joaquin rivers the value of the watershed cover on the Sierra and Coast Ranges will be increased.

Considering the major land uses in California which are affected by forest, brush or grass fires there are 16,200,000 acres of timberland, 16,600,000 acres of brush and woodland, 27,500,000 acres of grass, 24,900,000 acres of desert and sagebrush and 8,400,000 acres of cropland. Of the crop land, 3,500,000 are irrigated and 4,900,000 are nonirrigated.

Taking the five year period from 1931 to 1935 as an average of all conditions the Forest Service records show that in the entire state there were annually 3480 fires which burned over 453,500 acres and damaged timber, forage and other resources to the extent of $1,256,000. Since the advent of the Civilian Conservation Corps in fire protection in California in 1933 there has been a forty per cent decrease in acreage burned with a corresponding drop in damage.

California needs additional man power in summer term men who can be made into trained fire fighters. This is equally true of the State Division of Forestry and the federal Forest Service which has not been adequately manned in the past. Both the federal and the state forest services need more motorized equipment such as tank trucks, patrol cars, squad trucks and fire tractors. Radio equipment should be augmented. There should be more systematized educational work in the schools on the care and protection of natural resources. There should be additional specialists to provide for adequate, firm and impartial law enforcement to cover both civil and criminal action in fire trespass and there should be an increase in the number of CCC camps.

No accurate comparison can be made as yet of the relative difficulty of controlling fires in California as compared to elsewhere. Other regions have more lightning fires, some are subject to heavier winds and some have a dense matt of duff which makes it hard to stop a forest fire. However, statistics compiled by the Forest Service show that there are forty-two million acres in the State needing protection from fire, which is forty per cent of the total area and over ten million acres more than any other State. There are more miles of road and highway through inflammable ground cover than anywhere else in the country and these are travelled by more people through the longest dry season.

No wonder California pays the Red piper.

THE EVOLUTION OF FIRE-FIGHTING EQUIPMENT

By DAVID P. GODWIN Assistant Chief, Division of Fire Control, U. S. Forest Service

(Photographs by the Forest Service)

OF THE well known forest fire trilogy—prevention, presuppression and suppression—prevention is the most intangible. It is hard to get hold of, and therefore its evolution has been a slow, lagging thing. In spite of all applied means, the curve of "number of fires per area" has been a rising curve, expressing the comparative failure of fire prevention effort.

The earliest methods of fire fighting were confined to "knocking down" the blaze with a wet sack or blanket

On the other hand, suppression is a tangible something, dealing with men under organized direction and equipped with real things, tools. Here the evolution has advanced more rapidly and continues to express itself as an accomplishment curve. Year by year the "average acreage per fire" is being forced down. The all-time record in the national forests was reached a year ago when burned area was held down to 498 acres for every million under protection.

Greater skill in the selection, training, placement and handling of men accounts in part for this gradual reduction as does the extension of physical improvements facilitating detection, communication and transportation. But much of this betterment of performance is due to the tools and other devices developed to implement the fire fighter.

In tracing through the evolution of the tools of forest fire fighting, and looking with pride upon the last word in mechanized equipment—don't overlook the infantry. It helps maintenance of a reasonable sense of proportion to hold in mind the significance of the infantryman, the man equipped with the rifle—the hand weapon, and operating as one of a group under direction.

That the field of battle is won or lost by the man on foot equipped with a hand weapon is borne out by the record of the development of military science. The reason lies in the fundamental fact that infantry occupies and holds area. This important characteristic is not possessed by cavalry, artillery, tank corps or air corps. These arms are necessary but auxiliary.

In treating of forest fire fighting the military analogy can easily be carried too far, but in this particular respect there is much similarity between the two types of activity. The man with the shovel or the ax will remain the indispensable unit—the backbone of the attack. He occupies and holds area—or more correctly—line.

The earliest methods of forest fire fighting were confined pretty much to "knocking down," and the tools used in the job were about as simple and primitive

Fire fighting equipment today is highly mechanized—and one of the most important developments has been the man-packed water pump

One of the most recent developments in the fire fighting field is the combined tractor, bulldozer and water tanker

Tractor-drawn plows clear fire control lines

as Gunga Din's uniform. The beating out, when such approach was possible, was often accomplished with a coat or slicker or wet sack or even a saddle blanket. A tool in great favor was a pine top or bough cut on arrival at the fire's edge.

Soon the farmer's and woodsman's tools available at all general and hardware stores came into use. The shovel, ax, hoe and rake. These are basic hand tools developed by man through centuries of manual labor. For several years after fire fighting became an important function of forestry agencies these tools were accepted as they were, wherever they could be picked up, and little thought was given to size, weight and balance. But gradually it became apparent that more careful selection was essential to efficient work and labor conservation. Careful study, design and test have resulted in standards of shape, weight, balance and quality which will probably stand for many years to come.

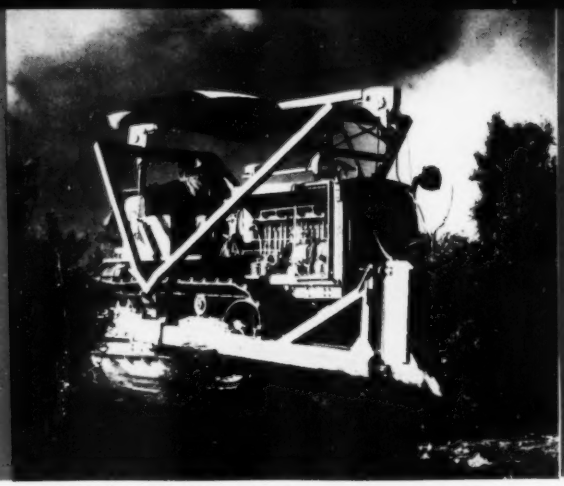
The shovel and the ax are fundamental—the digger and the cutter. Peculiar conditions of growth and litter have brought demand for other hand implements; hoes, rakes, weed cutters and flails. The latter, generally known as the swatter, has been perfected and is used to good effect in the grass roughs of the southern pine regions. For years men have tinkered with the idea of combination tools. Many models have been produced, but most have gone with the wind. Two important survivors are now in much favor, two thoroughly practical and effective tools—the McLeod tool, a sturdy combination of rake and hoe, and the Pulaski tool, a combination of ax and mattock blade.

So out of this evolution—accelerated in the last two decades—have come about a half dozen standby tools—the hand weapons of our fire fighting infantry.

The development and perfection of the gasoline engine, together with the mechanical advances incident to the World War, had profound influences upon forest fire fighting equipment, as they did on the equipment used in agriculture, construction, logging and military

And portable power pumps and thousands of feet of linen hose are effectively employed by the modern forest fire fighter

Tankers—trucks carrying water and pumping apparatus—get to fires quickly and do effective work



Particularly effective in brush type of country is the new "brushbuster"—huge blades mounted on a tractor

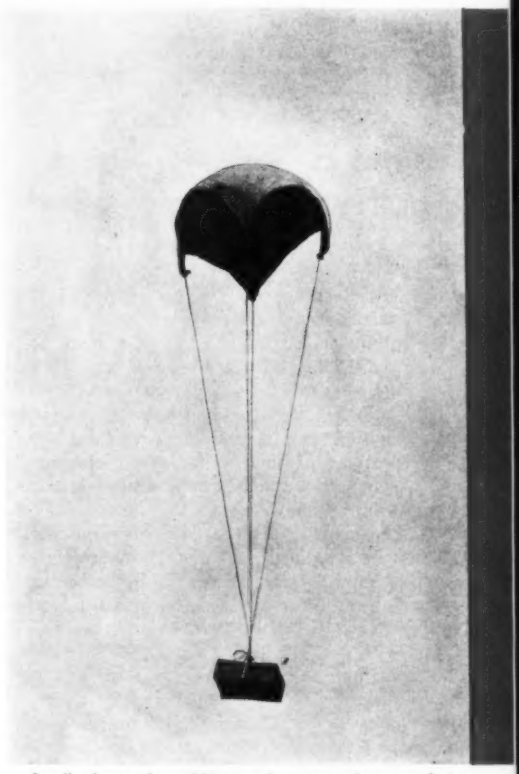
The airplane is finding its place in fire fighting technique. Transporting supplies to remote fire camps is one of its most serviceable functions

establishments. These epochal engineering developments had real meaning in all the fields of fire control equipment—water throwing devices, transportation vehicles, fire line builders, back-firing devices, chemical apparatus and aircraft.

It seems strange to most observers that foresters for some years did not employ water—the age-old quencher of fire. In city fire suppression the fire engine had long been a familiar sight and for years before that—the bucket brigade. Absence of water supply within reasonable distance and non-existence of suitable water throwing devices probably account for the early reluctance to use this great means of suppression. Today the story is quite different. Beginning in the early twenties, study, invention and experimentation made a good start. Year after year practically every means of water application was given a tryout in an effort to apply it to our peculiar needs and the process continues.

The one-man outfit—the back-pack tank and trombone pump—is now very generally used and is a most satisfactory rig. Its use is confined mostly to "mop-up" work and in back-firing operations, but it has prevented the break-away of many hundreds of fires. Continuing effort is being made to decrease the weight and improve the pumping devices to reduce fatigue and conserve the water supply through greater accuracy of stream placement.

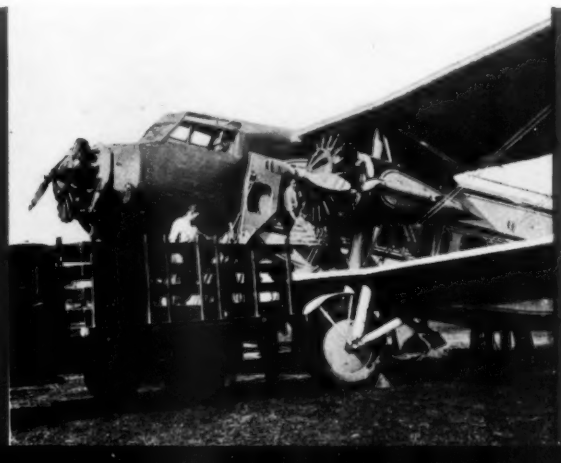
Portable power pumps using a one and a half inch hose have been brought to a high degree of efficiency, and it is now possible to carry a strong stream of water thousands of feet even in rough country. Trucks carrying their own water supply and pumping apparatus—generally known as tankers—get to fires in quick time and do most effective work. Their use is often supported by tank trailers. The use of the tank truck, however, is—in most terrain—restricted to roads. The tractor, because of its ability to go most anywhere, has been equipped with tank, pump and hose reel. This development, however, is too recent to have demonstrated (*Continuing on page* 235)



Small planes drop 200-pound cargoes by parachute

The Bosworth trencher, latest power-driven fire line building machine, does the work of many men in record time

Larger planes function in the transportation of both men and material from established bases to remote landing fields in the mountains



WHY FOREST FIRES?

By JOHN B. WOODS
Forester, National Lumber Manufacturers Association

ONE MIGHT assume that the only sure way for a resident of these United States to remain oblivious of the forest fire problem would be to spend all his life indoors and at least fifty miles from any forest area. Such an assumption fails to allow for human resistance to education and enlightenment. Of the hundred and thirty million people who chase each other over hill and plain or burrow in city and village, probably not one in six has any informed interest in this tremendously important physical-social phenomenon, fire.

Forest fires are remarkable, any way you look at them: in their origins and the conditions which cause them to leap out of bounds, in their spectacular beauty and fearsome effect upon beast and man, in their capabilities for destruction. Perhaps they are most notable because of the simple fact that we, a supposedly civilized people, tolerate them. In that they resemble our nationally shameful crime wave. Both are heritages of a pioneering period and of a careless attitude toward life. When we attain full civilized stature, we shall have done away with such childish things.

Potentially, dwellers in town and city are most important in this fire picture. By their numerical superiority they control political processes and the machinery of federal and of most state governments. To them we must look for enactment of laws to cope with the problem; for the funds and the administration to make such laws effective. Since these people took to dashing across country on their week-end or month-long holidays, we look to them also to set a considerable portion of our forest fires.

Admittedly, many city dwellers cannot or will not absorb much information unless it is fed to them by Walt Disney or Charlie McCarthy; but at least their behavior conforms fairly closely to a simple pattern. Out in the sticks, however, meaning on farms and in the forest settlements, there dwells a race of people who do not act or think alike about forest fires or anything else.

Most of us, in our more public-spirited moments, have asked, "Why Forest Fires?" Then we squeeze a great dripping mass of fact and fancy and try to wring out a reasonably simple and fairly useful answer. Forest fires occur, of course, because there are in all the forest regions of this country large areas more or less thickly covered with inflammable living and dead vegetation; because at certain times during the year weather conditions are favorable for rapid burning of such material; because adequate suppression forces are not available to stamp the fires out while they are small.

Roughly, there are three kinds of forest fires: the crown fire, which roars through the timber in a solid wall of flame; the slash fire, which consumes debris left after logging or clearing and at the same time kills most of the vegetation still remaining; and the ground fire, which is usually simply the burning of grass and weeds underneath the trees or in the openings left by earlier forest harvesting. Given dry weather, wind, and green timber upon which to feed, either slash or ground blazes may "crown." Man can alleviate in part the risk which follows immediately after logging by promptly burning the debris, under control. But as new brush and weeds come in, the risk usually climbs and he either must protect the rough or burn it periodically when conditions are favorable. Here as elsewhere, the price of safety is eternal vigilance.

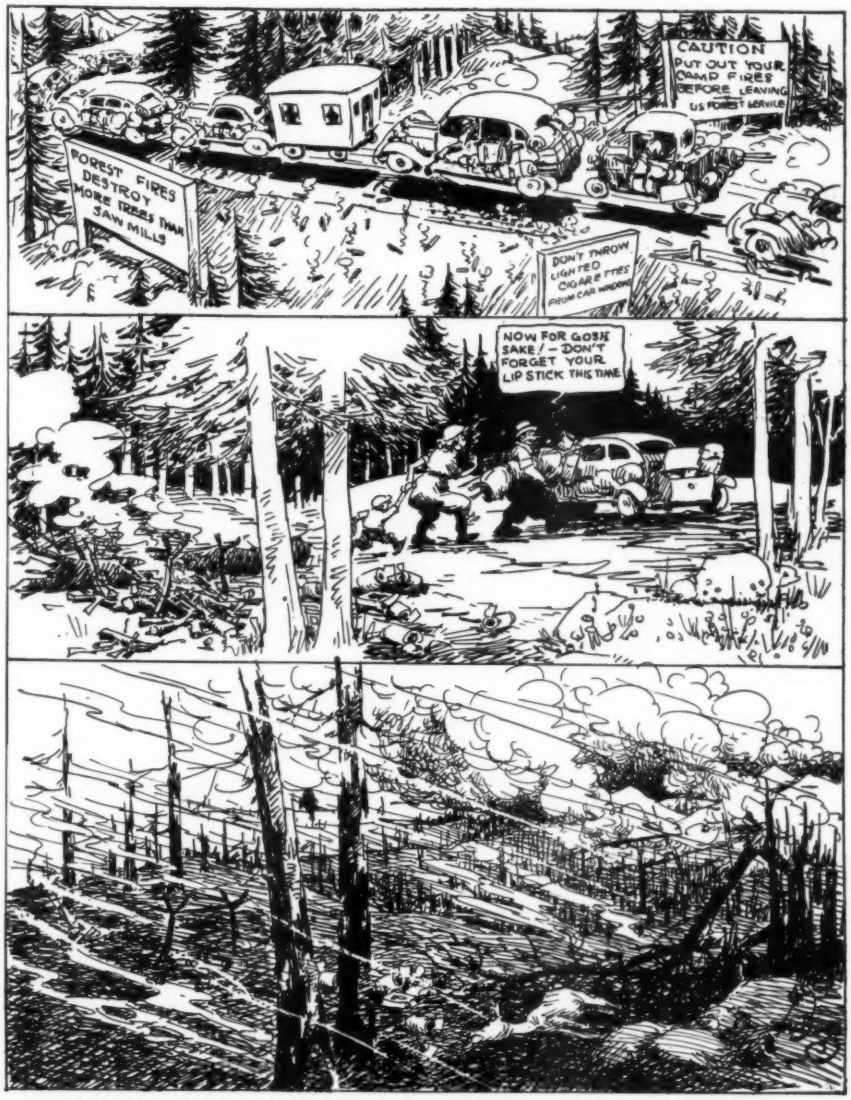
It is true that some fires start from natural causes; in many high mountain areas lightning plays an important role as a starter of blazes. All other natural causes are negligible. Man is directly responsible for nine out of ten fires which start.

One naturally would assume that most man-caused fires are the result of carelessness, rather than malicious intent. Yet in every protection organization, where records are kept, there is disquiet over the increasing prevalence of incendiarism. But taking all causes of forest fires, by and large, the greatest single cause unquestionably is human indifference. Few of us are like the dirty, ignorant, Irish sheepherder on the slope of Yamsey Mountain in Oregon, who saw and heard a lightning bolt shatter a giant fir. He saw also within the next few minutes a cloud of smoke billowing up from the surrounding jack pines. It was not his fire and he knew that within a few hours the regular patrol would arrive to put it out. But just the same, he whistled up his dogs and made them harry two thousand ewes with their lambs round and round the fire until the sharp hooves had cut a clean trail which confined the burn to the small patch in which it started. It is unfortunate that so few of us are like him.

Old-timers from the Lake States, looking back upon the days when the white pine forests were being leveled and the patches of "daylight in the swamp" were growing larger and larger, feel no particular shame over cutting the pine because out of that material grew the homes and barns of the Great Plains farming country. But they do shake their heads over the fires which ran wild throughout the region year after year and which apparently were nobody's responsibility. Considered on an acreage basis, the great southern region, of course, leads all the others combined in area burned over annually. No one who has visited the South during a dry autumn or in March of any year can fail to recall the biting pungency of burning pine stumps and scorched seedlings. There are two schools of thought in the South among the country people: one believing that it is necessary to burn the rough each year, to kill "varmints," bring in early grass and fireproof the forest for another twelve-month; the other appreciating that forest growth is better when the soil is enriched by accumulated leaf mold and that upland hardwoods suffer in quality just as pine suffers in growth rate from the attrition of repeated fires. But even though the number of persons opposed to burning may equal that of the others, the odds are all with the latter, because fires are easily started and hard to stop.

A wise and observant student of the problem declared recently that woods burning can be stopped in the South only when we convince woodland owners and users that such burning damages them personally. Taken by and large, that comment applies everywhere in the country. But it does not answer the whole problem. Some people cannot be reached either by education of themselves or their children. Under certain circumstances they may require restraints or prohibitions backed by stiff fines and even prison sentences. In general, the attitude of the Courts toward incendiarism has been such as to encourage lawlessness, rather than to curb it.

Many of us assume that we cannot be hurt personally by forest fires. They may cause some waste of a natural resource; but there's still some left, and we are too remote from the "hot" spots to be deeply concerned. Our solicitude for the "public good" simply doesn't reach that far. Considering our national habits of stopping without signalling and trying to beat each other to every intersection, it is not surprising that we are not greatly concerned about the rights of others in this matter of protection from fire. As a matter of common fairness, however, people who own forests or live in proximity to forests are entitled to protection from such hazards to life and property. The whole nation should unite to guarantee such a right. Incidentally, it is obvious, of course, that we ought to protect our forests as a national resource in which we all have a stake. We have, then, all the reasons in the book to support our contention that woods burning must stop: the larger public good, the promise of personal and individual gain, the letter of the law, and the sentiment of those who are best informed. How to sell such a collection of old-fashioned ideals to the American public is a challenging puzzle.


CAUTION
PUT OUT YOUR CAMP FIRES BEFORE LEAVING
U.S. FOREST SERVICE
FOREST FIRES DESTROY MORE TREES THAN SAW MILLS
DON'T THROW LIGHTED CIGARETTES FROM CAR WINDOW
NOW FOR GOSH SAKE! - DON'T FORGET YOUR LIP STICK THIS TIME

LOOK OUT! HERE COME THE SUMMER TOURISTS—Drawn by J. N. (Ding) Darling

A CCC camp receives a fire call — the alarm is sounded

A fire fighting crew, well trained, responds on the run

THE CCC AS A FIRE F

By JOHN D. GUTHRIE

Photographs by the Forest Service

IT IS a safe assertion that there has been no large forest fire in the United States since May, 1933, that has not had some CCC boys fighting it. They have fought forest fires from Maine to Arizona, and from Washington to Florida; they have become the first line defense in the annual fire battle.

When a fire call comes to a CCC camp, everybody wants to go; there is no need to call for volunteers nor to impress any enrollees. One has to hold them back, not urge them on. It's something new for most of them; it's excitement, action, color—the things that appeal to youth.

Perhaps the biggest contribution made by the CCC to the conservation of the natural resources of America in the past six years has been the protection of the forests from fire. Certainly no other item in their list of daily activities during the first five years shows a larger expenditure of their time—the stupendous total of 4,096,610 man-days.

There have been dry and parched years since 1933 in this country. The droughts of 1935 and 1936, for example, when the Dust Bowl was stirring up its clouds and sending them eastward over the Atlantic seaboard. This was spectacular to the East, but the forests on the foothills and mountains of the Alleghenies the Ozarks, the Rockies the Cascades and the Sierra Nevadas, were often dry as tinder. And fires did start, from lightning bolt, from careless smoker and thoughtless camper—and when they did, the calls from the fire lookouts went buzzing through to the CCC

Upon arrival, the camp foreman directs the plan of battle

The fire is still small, but getting hot and dangerous

To a waiting truck, equipped with fire fighting tools

Then away to the burning forest with all possible speed

RE FIGHTING UNIT

General Inspector, CCC, U. S. Department of Agriculture

camps. And the boys poured out of the barracks, night or day, into the tool-filled trucks and swung away to blazing trees and hillsides.

But for these camps scattered over every state, who knows what a staggering forest fire toll there might have been? The year 1935 might well have been an epochal 1910 fire year but for the CCC boy. He has fought forest fires on a thousand fronts these past six years—but he has done a better thing than that. He has built forest roads, truck trails, and horse and foot trails into the back country, threaded telephone wire over the hills, thrown up fire towers, so that fires could be found and brought under control quickly. His fire prevention work through such protective forest improvement has been as big and as important as his fire fighting.

When the CCC started, the idea was that as far as fire fighting went, the Corps was to be a last resort, an emergency agency, the reserves—the last to be called up in the fire battle. It was believed that the boys were too young, too slim, too soft, perhaps not to be depended on, for the rigors of the front line of fire. Fire fighting was a man's battle.

But the boys were tried out that first summer of 1933. They were keen to see a forest fire, to get into the fighting, eager to try out their new-found muscles. They fought, they worked and worked fast, they did what their foremen told them to do, they learned, they stuck. True, they had to be constantly warned to be more careful, to take less risks, to look out for falling trees and rolling boulders. (*Continuing on page* 238)

So a fire line is thrown across its path to check its spread

And water pumps are employed to put the fire "dead out"

GETTING RESULTS BY LAW ENFORCEMENT

By E. O. SIECKE
Director, Texas Forest Service

LIKE many other timbered states, Texas has a law that makes the setting of fires on another's property or letting fires carelessly escape to another's property a misdemeanor subject to action by law. Through disregarding this law 123 "firebugs" have been convicted during the past three years. Not a very large number when it is a matter of record that 2,500 of the state's 6,000 annual forest fires are of incendiary origin, but—and on this feature hinges a story of great significance—every one of those 123 "firebugs" pleaded guilty before being brought to court!

It started back in 1935. The Texas Forest Service had been protecting from 6,000,000 to 10,000,000 acres of forest land in the eastern part of the state for a period of twenty years. During that time very little effort was made to enforce the forest fire laws, emphasis being placed on educating the citizens of the piney woods to the need of protecting the forests from fire. This action was based on the belief, and rightly so, that forest fire prevention depended first on the education and good will of the people. But in 1935, after a particularly disastrous season of incendiary fires, the Service discovered that the good will system was not paying the expected dividends of decreased fires—that is, not where incendiary fires were concerned. So it was decided that another approach must be made—this time through forest fire law enforcement.

The decision made, no time was lost. Early in 1936 the Service appointed an officer, first arming him with a special Texas Ranger's commission, to investigate fire law violations. In February the first offender was brought to justice in Nacogdoches County. By a stroke of fate he was caught in the act of setting a series of fires along a county road. Justice moved swiftly. He was brought to court, indicted on a misdemeanor charge, pleaded guilty, and was assessed a fine and court costs. The case caused considerable speculation in east Texas. Here was something new—"fining a fellow for firing the woods.

Other cases followed. With each succeeding conviction it became more apparent to the public that this new idea of apprehending violators meant business. By the end of the first year eighteen persons had been convicted out of a total of thirty-seven cases. What happened to the others? One fellow fled the state, forfeiting his bond, four were dismissed for technical reasons, four were dismissed by agreement, and only two were acquitted. Eight cases remained for action at the end of the year.

When a fire turned up that was traced to incendiary origin or showed violation of the fire law, a forest patrolman usually collected all the information he could. If the case showed promise the law enforcement officer was called in. Together they went over the ground searching for signs. Sometimes there was a footprint, a horse hoof print, or an automobile tire track that when traced back led to the culprit's home. Sometimes it was just "pure hunch," plus careful questioning of a suspected party that brought a plea of guilty.

For all the law enforcement efforts, however, incendiary fires in one section of east Texas—the longleaf pine belt—did not decrease. So the service decided to lay the problem in the laps of the local county officials.

Early in 1938 a meeting was called at a CCC camp in Jasper County. Officials representing four counties, public spirited citizens, and forest officers were present. Foresters pointed out the damage being done by fires, how the forests supported many industries and wage earners, how fires were "sapping" the timber and economic strength of the locality and, finally, how most of the fires were indiscriminately set.

This public contact work was extended to the adjoining counties of Newton, Polk and Tyler. Leading citizens and civic clubs appointed forestry committees in their organizations and drew up strong resolutions against woods burning. Newspapers showed increased interest in the situation. Two temporary fire law enforcement agents were employed to work in this area during the hazardous spring fire season.

In Polk County, after a special meeting attended by 500 farmers, the chamber of commerce sent an official around the county with the Texas Forest Service educational motion picture truck for a series of evening meetings in the rural schools and churches.

As a final measure, the Service started an organization of volunteer forest fire guards, made up of the citizens themselves. In signing the agreement, the citizen agreed to help prevent forest fires and also help fight them when they occurred. His cooperation is purely voluntary and he receives no pay for his work. The organization numbered 3,000 at the end of 1938 and was increasing rapidly.

Have law enforcement and these other efforts had any effect on decreasing the number of incendiary forest fires? Yes. In 1936 there were 7,800 fires; in 1937 there were 6,400; and in 1938 the number was 5,900. Correspondingly, the number of convictions has increased from eighteen in 1936 to sixty-eight in 1938. In 1936 and 1937 incendiarism caused forty per cent of the fires in Texas. In 1938 records show a drop to twenty-nine per cent. Another point is that all this has been accomplished in face of extending protection during these three years to 3,500,000 additional acres of new country never before protected.

What about the future? It is the opinion now that forest fire law enforcement, though perhaps the hard way, is worthy of continued and increased efforts. Steps are planned to put more teeth in the state's forest fire laws. A new law enforcement agent was added to the roll in 1938. If two of these officers find the job is too big, more will be added. A new era of forest protection is coming to the east Texas piney woods. It is an era in which the old method of fighting the flames by brawn and muscle is gradually being absorbed by the newer method of fighting the flames with brain power and laws —yes, and fighting the flames before they start.

International Harvester

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14. Allied equipment engineered for the TD-18 by well-known manufacturers.

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FIGHTING TOMORROW'S FIRES TODAY

By R. M. CONARRO
Supervisor, De Soto National Forest, Mississippi

As an example of what is being done by the federal Forest Service, as well as by many state agencies, especially in the South, to enlist the youth of the nation in forest fire prevention and other phases of conservation, this article is of particular interest.

THE United States Forest Service is no advocate of the "isms" of Europe but it is teaching a doctrine of hate in the schools on the national forests in Mississippi. Here it is an American hate, not directed against a people but against the needless, ruthless destruction of our most valuable natural resources. Specifically, it is a hate against forest fires.

For just as pellagra was once the debilitating scourge of the South's lower income class, so today forest fires are the deteriorating ravage of the South's forests of tomorrow. Conservation in Mississippi has been regarded with more or less resigned indifference on the part of John Q. Public. He treated a great timber empire like the goose that laid the golden eggs. He accepted with nonchalance 50,000 fires and 10,000,000 acres burned in a single year.

In 1933 seventy per cent of the area which is now national forests was subjected to fire. In 1935, the first year of organized protection by the federal Forest Service, 1,187 fires burned 50,000 acres on the national forests alone. It was in this atmosphere of public apathy toward forest fires that Forest Rangers Ed Haff and Leonard Beltz initiated an intensive fire prevention campaign in twenty-two grammar schools on the Homochitto National Forest, in southwest Mississippi. The feature of this program was a fire prevention contest in which each school was allotted a definite area to keep free from fire. A map of the forest on which the areas were outlined was hung in each school and once a month a forest officer stuck (*Continuing on page* 216)

Mississippi Advertising Commission

Forestry "showboats" travel from school to school, presenting the message of forest fire prevention by means of movies, music and the microphone

It takes an INDIAN to Stop FIRE BEFORE IT SPREADS!

Halt the Red Demon of destructive forest fires with INDIAN FIRE PUMPS! The United States Forest Service estimates there are 150,000 forest fires in the country each year, that they burn approximately 40,000,000 acres, destroy $50,000,000 worth of timber and consume enough wood to build 100,000 five room houses. Of the 11,665 fires that occurred in National Forests last year, 53% were caused by "acts of man."

INDIAN FIRE PUMPS cut down this tremendous waste—save lives, save property, save money. Thousands are in use by foresters, lumbermen, fire departments, CCC camps, farmers, out door men. Their comment speaks volumes for the effectiveness of these great fire fighters:

"40 INDIANS saved the town of Brentwood, Long Island, from destruction by a forest fire."
W. H. Baker, Fire Warden.

"The past season proved a crew equipped with INDIAN FIRE PUMPS stops any forest fire."
P. S. Robinson, Forest Ranger, Sigel, Pa.

"We just used INDIANS to fight a big forest fire in northern Wisconsin. They are the best rig for this purpose I ever saw."
Frank Ray, Chairman of the Board, Shanagolden, Wis.

NEW RUST PROOF TANK

Send for copies of other testimonials from actual users and our descriptive catalog in color.

because

Clear water does the job—no chemicals. Just fill 5 gal. tank and you're ready. Easy pumping throws powerful 50 ft. stream that goes right to the base of the fire.

- Carries high on shoulders—no chafing.
- Built to comply with all Hand Pump requirements of National Fire Protection Association.

REMEMBER THE NAME INDIAN
THE SAVAGE FIRE FIGHTER

MADE IN AMERICA BY
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Roy G. Davis Company
617 E. 3rd St., Los Angeles, Cal.

Fighting Tomorrow's Fires Today

(*Continued from page* 214)

red pins in the locations where fires had occurred. The contest ran for six months. Prizes were awarded the schools having the least number of fires in their areas. The success of the "little red pins" is illustrated in the following incident:

A suppression crew, responding to a call, found that a farmer's debris fire had got away from him. But before the men could shoulder pumps and shovels a very tired farmer, dragging a pine top and rubbing his smoke-filled eyes, staggered toward them. Instead of offering excuses as to how and why the fire escaped, this smoky son of the soil exclaimed fiercely; "Don't y'all git off that truck. I got this fire stopped. My li'l gal don't want no red pins in her school map and I don't wanta cause her to git any."

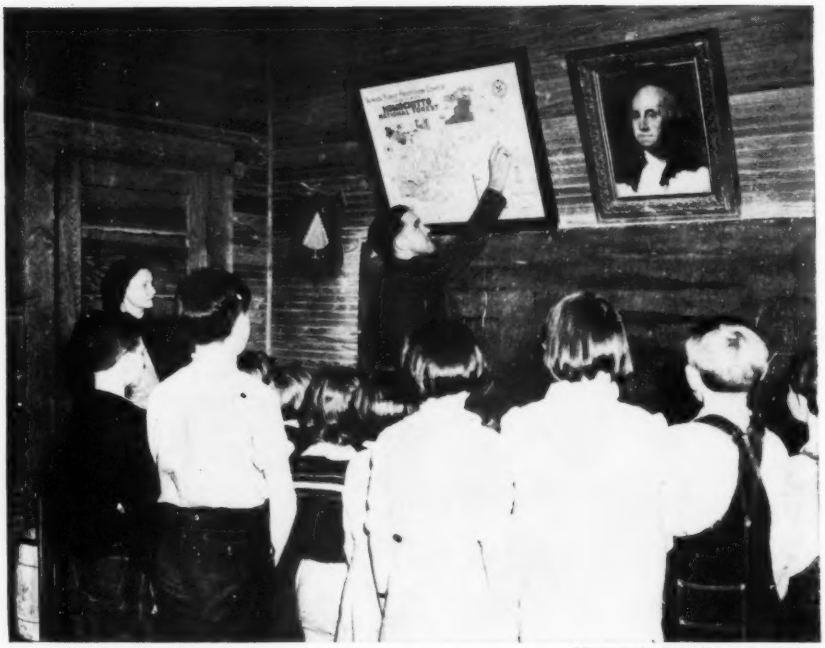
Further evidence that Rangers Haff and Beltz had struck pay dirt in their prevention prospecting was shown by the increasing number of local residents who volunteered to fight fires. It is now not at all unusual on the Homochitto and other national forests in Mississippi for a regular crew to arrive at a fire and find a number of local people fighting the flames with pine tops or other crude tools. This effort is strictly voluntary and without any thought of pay.

As a result of the success of the Homochitto program similar contests were inaugurated on other Mississippi forests. The regional office at Atlanta became interested and an artist was assigned to prepare attractive picture maps of the district for each school. In addition to the red pins placed at the location of the fires, there was a large pine tree in one corner of the map. This tree was divided into sections. The record for each month for each school is shown on this tree in either red or green, according to whether or not there was a fire in the school area during that month. The object, of course, is to keep the tree green.

The allotment of areas passes the problem of fire prevention directly back to the residents of that area who are, in most cases, responsible for the fires. In this way other residents of an area feel a personal resentment against the person causing the fire which under other conditions could pass unnoticed.

Rangers have discovered that it is better not to develop too intense competition between schools on one district. Instead, the progress of the forest as a whole, in comparison with other Mississippi forests, is emphasized and each school is pictured as an individual sector on a battle line which must not permit fire to break through.

As an added attraction to the fire prevention contest, Ranger Bill Bergoffen, on the Biloxi district, sponsored an essay contest in the schools. The subject was one having to do with forestry and fire control. The best papers were submitted from each school. The judges were newspaper editors and the local superintendent of education. The five winning essays were published in the local newspapers and, as a climax, the two winners, a boy and girl, read their papers over a local radio station.



Mississippi Advertising Commission

School children, with their parents cooperating, participate in forest fire prevention contests under the direction of a forest ranger

The most ambitious program to get fire prevention into the schools since the original prevention contest was begun is one sponsored by Ranger Carl E. Benson on the Chickasawhay district of the DeSota National Forest. This program is developed around an organization of "Junior Forest Guards" composed of a number of grammar school boys from each of the schools on the Chickasawhay district. Each boy can join only after he has passed a written examination made up of questions having to do with the national forests and forestry. At the present time the organization has about eighty-five members.

The purpose of this organization contains the very fundamentals of true conservation. The by-laws state in part: "The object of this organization is to bring about better management of the national, state and private forests and farm woodlots within and adjacent to the Chickasawhay district in order that these may render their highest service in the economic, industrial and social development of this part of Mississippi." There is something stirring about this objective, something which is truly American, yet it belongs to the new order of things. Here are the grandchildren of the pioneers who settled the South, learning to see a new horizon—not the dangerous, romantic one which lured their grandfathers from the East, not the golden, commercial one which their fathers cashed in on, but a modern restricted horizon of conservation and rebuilding. These youths are the very soul of the Mississippi of tomorrow. As they are trained today, so Mississippi will be in the years to come.

Entertainment and education are combined in a Forest Service moving picture outfit which visits every school on the Mississippi national forests at least once a year. This equipment is carried on a panel-body truck which is also equipped with a microphone and loudspeakers. The whole outfit resembles a land edition of a Mississippi "showboat," and this name is appropriate. Offering anything from Mickey Mouse comedies and hill-billy music to personal messages from Chief Forester Silcox, this Forest Service showboat is always welcome. The operator and master of ceremonies is a local boy from Vancleave, Mississippi, who came into his present job through the ranks of the CCC. Tipping the scales at 240 pounds, T. L. Murphy has the genial smile and beaming personality of the born showman. The message of conservation is sugar-coated with stories, movies and music and the audience learns and laughs at the same time. Although these shows are primarily for school children, grizzled farmers will often drop the plow handles and travel several miles to see them.

Colored as well as white schools are visited and here, especially, the whole family turns out. The colored residents of the national forests take their "reforestry bizness" very seriously. They learn quickly and are among the most loyal cooperators.

Many of the schools have been assigned small (*Continuing on page* 228)

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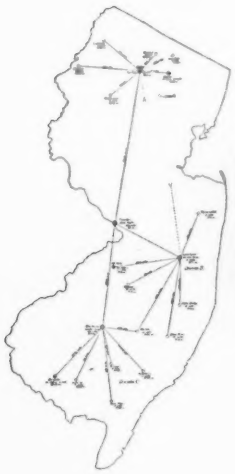

Layout of Haigis Coyle Plan of radio communication in New Jersey. The installation is described in detail in this issue.

Transmitters, receivers, automatic relay equipment, antenna systems and mobile units especially designed for this service are available. Consult us on *your* particular problem.

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"CALLING ALL FIRES"

By CAPTAIN LeROY S. FALES
State Fire Warden of New Jersey

IN COMMON with many other states, much of the woodland and mountain areas of New Jersey are without adequate telephone communications — a serious handicap to any plan looking toward forest fire control. Therefore, New Jersey, in pioneering a state-wide system of liaison, started several years ago experimenting with radio-telephone.

First efforts resulted in setting up simple radio links between two fire lookout towers and testing with mobile units in the field from these points. These experiments soon demonstrated that such circuits, and the random communication afforded by them, would not provide a system satisfactory for handling all communications between various points with a speed necessary to meet emergencies, nor with a message-handling capacity great enough to provide this needed speed on days when a large number of fires were burning.

A basic principle upon which such a state-wide network would function was evolved—a system known in New Jersey as the "Haigis-Coyle" plan. This system has now been developed to the point where it is applicable to any state, and can be varied to suit any conditions by the application of principles of radio transmission of the ultra-high frequencies upon which channels this system operates.

A total of eighteen observation towers, three division headquarter offices, state headquarters, the fire service observation airplane, nineteen mobile field units, and twelve back-pack sets for use on fire lines are included in this system, and this complement can be extended as desired without use of additional channels.

One tower in each of the three tactical divisions into which the state is divided is selected as a "control" tower. A transmitter is installed at this point capable of transmitting to each of the other auxiliary towers of the division, the observation airplane, and also to the division headquarters as well as to state headquarters.

Receivers installed at each of the other points are tuned to the control tower transmitter frequency at all times, and require no attention. Transmitters installed at each of the auxiliary towers, division and state headquarters all transmit on a second channel, and are picked up by a receiver at the control tower. Automatic relay equipment is installed at this point which puts the control tower transmitter on the air and re-broadcasts any signal received. It will thus be seen that any tower of a division can communicate instantly with any other tower in its division, and also with its division or state headquarters through the medium of this control tower relay. To accomplish this with any number of stations requires but two channels, the only limit being when full time operation of the control tower transmitter will no longer handle the message traffic.

In our system six channels—two in each division—provide independent inter-communication throughout each of the three divisions and to state headquarters where three receivers are located, each tuned to the control tower of a division. The transmitter at state headquarters can be operated on any one of the three division auxiliary tower channels by "push button" control on the operator's desk, and can, therefore, communicate with any desired division without interference to message traffic in the others.

A second receiver is also installed at each auxiliary point and these receivers are tuned to the channel used by the mobile units. These mobile units are, therefore, received simultaneously at every station within their range, and in New Jersey it is quite impossible to find any location from which communication cannot be had with at least one lookout tower.

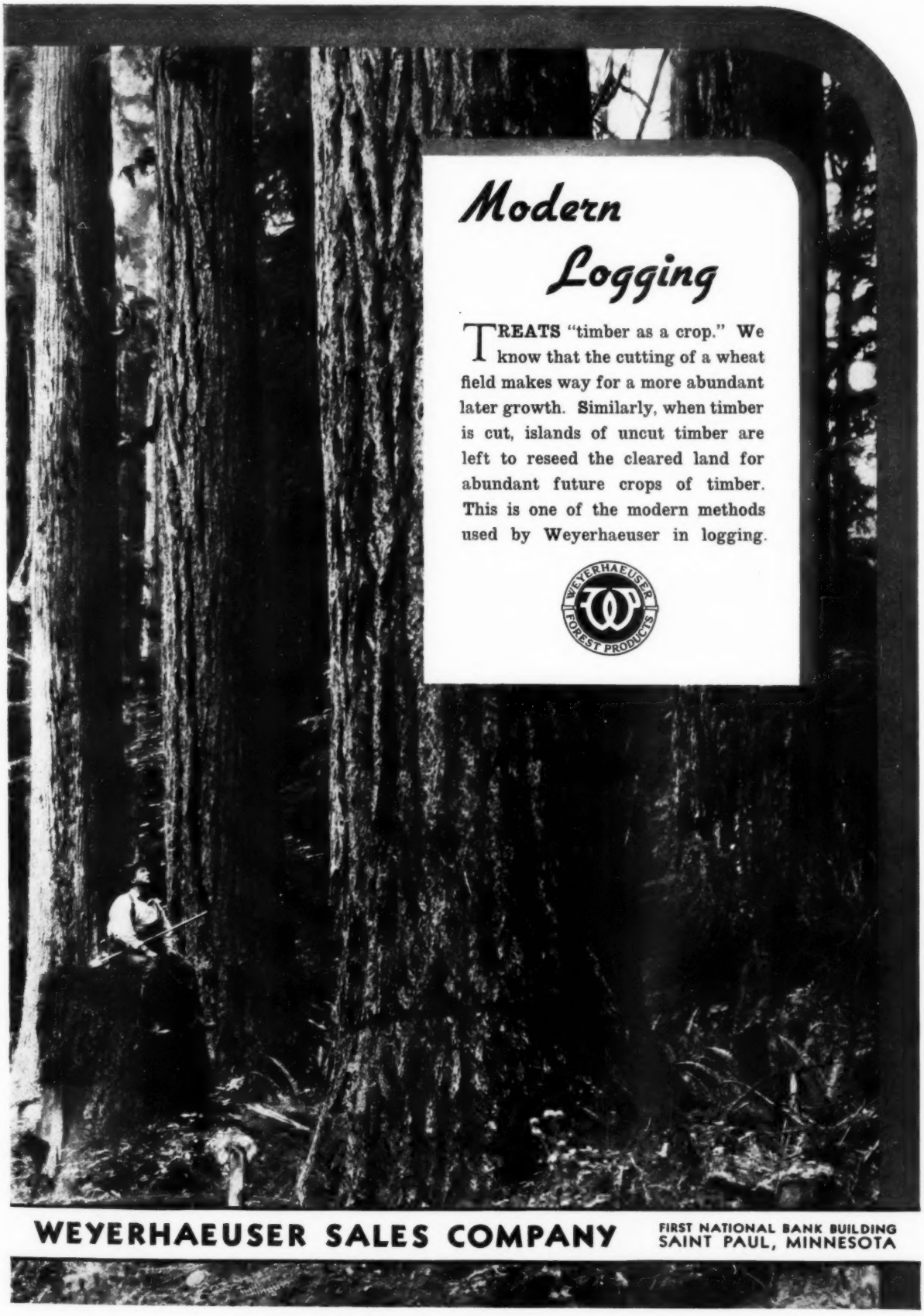
At present, the mobile units of a given division transmit on the same frequency as that of the auxiliary towers. This requires that the mobile receiver at each auxiliary station be tuned to the same frequency on which it transmits and, therefore, is inoperative during transmission from that point.

The loss of priority during these brief intervals has not been found serious, and even this can be eliminated by the use of a third channel for mobile units throughout the state. Then the mobile receiver, tuned to a different channel, will receive when the transmitter is operated simultaneously at the same locations. By a simple control, the operator can then rebroadcast the mobile message into the network and verbal relay of mobile messages to distant points will be eliminated.

The equipment was especially designed to provide reliable communication under all weather conditions as economically as possible. All transmitters, both fixed and mobile, are of the crystal-controlled type, and will hold to within .02 per cent independent of temperature. The receivers in the control towers, in the division offices and state headquarters, and in the mobile units, are special superheterodynes having sufficient selectivity to reject adjacent channels in use for other services, a prime requisite in any emergency communication when speed is essential. Super-regenerative receivers are still in use in most of the auxiliary towers and will be superseded as time goes on, with superheterodynes and the service extended by installing the super-regenerative receivers in the homes and cars of various section wardens.

In southern and central New Jersey transmission paths to the control tower range from fifteen to thirty-five miles. Fifteen watt transmitters have been found ample to provide continuously reliable communication over these paths, and are used at all auxiliary points.

A forty-mile circuit exists from the southern division control tower to state headquarters (*Continuing on page* 227)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Forest Fires and the Tennessee Valley

Of the many interests which the Tennessee Valley Authority has in the Valley and the benefits which may be derived from the Authority's efforts there, the most important are related to or concerned with water and soil conservation. The Authority is concerned with two phases of water control; namely, control in the streams and control on land.

Over fifty per cent of the total land area of the Valley is now covered with forest growth. The importance of these forests to soil and water conservation in the Valley may be emphasized when it is pointed out that the areas of steepest slopes and heaviest precipitation are those generally covered with forests.

Of the many factors affecting the condition of the forest land in the Valley certainly the most important at the present time is that of forest fires. The effect of forest fires is well known and need not be emphasized except to point out that the portion of a forested area which is of greatest significance to soil and water conservation; namely, the forest floor, is the portion most frequently and severely damaged by fires. Woodlands which are burned over repeatedly, as is the case in large areas in the Tennessee Valley, contribute only a small portion of their potential benefits, and in many instances are a positive hazard through erosion of the unprotected soil.

The land area of the Tennessee Valley is 26,500,000 acres, of which 14,500,000 needs protection from forest fires. Of this area, 13,500,000 acres is now covered with forest growth. An additional 1,000,000 acres is reverting to forest through natural reforestation and by forest planting. At the present time, less than 3,000,000 acres, of the 14,500,000 acres needing protection, are adequately protected, and the most of this is land in public ownership.

On approximately 6,000,000 acres the protection provided is inadequate; and on 5,500,000 acres no organized protection is provided. On the private lands that are protected by the various states, it is estimated that between two and one-half per cent and three per cent burns over annually; on the 5,500,000 acres of unprotected land it is estimated that nearly ten per cent of it burns over annually. In other words, under conditions now existing in seventy-five per cent of the Valley forests, the average acre may be expected to burn over at least once every ten to thirty years.

Organized forest fire protection in the Tennessee Valley is provided almost entirely through state and federal agencies. Fire protection on lands owned by the federal government is provided by the administrating agency. Private lands are protected by federal and state agencies cooperating with counties or individual landowners under provisions of the Clarke-McNary Act. In the Valley there are a sufficient number of the public agencies to provide adequate protection if these agencies could be provided with public support and adequate funds.

There are two major needs for improving the forest fire situation on private lands in the Valley: (1) the extension of organized state protection throughout the entire Valley area so that such protection may be available to every acre of woodland; (2) the strengthening and improvement of existing organized state protection to a point where the annual area burned over is ultimately reduced to not more than a quarter of one per cent of the total forested area.

The extension of organized protection would include an additional five and one-half million acres of woodland, which is at present unprotected. In providing for the extension of organized state protection to this area, the existing state organizations would be in a position, if sufficient funds were available, to set up the necessary fire protection facilities. The extension of protection to this area should be handled through the existing state organizations.

For the improvement of protection on areas which are or which would be organized, funds are needed to provide more adequate detection of fires, including additional fire towers and telephone lines. Funds are also needed for organizing greater man-power for suppression.

It has been estimated that an expenditure of between four and five cents per acre of forest land is sufficient to provide adequate protection in the Tennessee Valley area. On the basis of a total of 14,500,000 acres of land needing protection, the total fund necessary for adequate protection would amount to approximately $700,000 annually.—(*From official statement by TVA.*)

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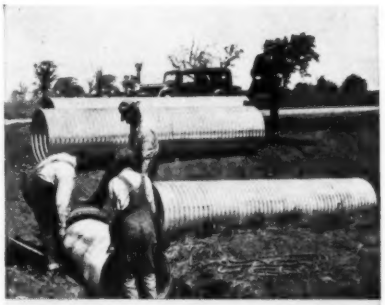

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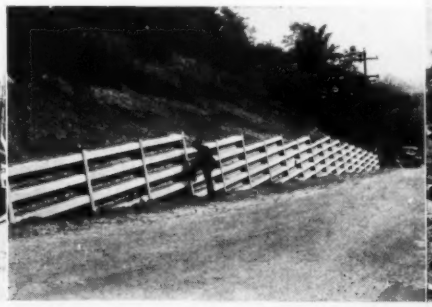

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FOREST FIRE DANGER METER

By ALEX PILCH

Some day, and soon, inhabitants of the Rocky Mountain region may expect to glance at the weather report of their newspapers and find an additional notation reading something like this: "Fire danger—moderate; normal protection force."

This mysterious, yet simple, language will tell how much danger there is each day of a camp fire spreading, of fires starting from matches and cigarette butts carelessly thrown away, or other innocent incidents which lead to fires. And it will also indicate what forces are necessary for adequate protection under the circumstances.

Where will the newspapers get that information? Not from the Weather Bureau. They will get it from the federal Forest Service stations in the Rocky Mountain region, each of which eventually will have installed a new and ingenious device called a fire danger meter. The device is a simple measuring stick to indicate the danger of fires spreading in the national forests. Regional Forester Allen S. Peck describes the equipment as "the same as the thermometer and barometer are to the weather man."

The Meter—developed by the Forest Service to forecast forest fire danger

Already several stations have installed them, including Squaw Mountains and West Portal in the Arapahoe National Forest; Red Feather Camp and Rollinsville, in the Roosevelt National Forest; Monument Nursery and Devil's Head in the Pike National Forest; and three in the Rocky Mountain National Park. About 200 will be used throughout the region.

The device's simplicity is in marked contrast to the highly technical information it purveys. It consists of a 16x22-inch board, on which is arranged an easily manipulated system of slides and pointers, similar in some respects to an engineer's slide rule. Unlike a thermometer, however, the conclusions reached from this device depend on a number of factors instead of only one—namely, wind velocity, temperature, relative humidity, number of days since the last rain, and condition of grass and other annual vegetation.

Each of these factors is assigned a certain per cent of 100 according to its importance. For example, six to eight days since the last rain is twenty per cent, and more than eight days twenty-five per cent. Each of the factors is treated the same way, and when its respective pointer has been set for each, the percentages are added together. The total shows the final rating, which is marked by a pointer in a slot at the upper left of the meter.

This slot has five divisions. Up to thirty per cent the fire danger is dormant; from thirty-one to fifty-five per cent it is low; from fifty-six to seventy-five, moderate; from seventy-six to ninety, high; and from ninety-one to one hundred per cent it is extreme. Opposite each of these divisions is shown the fighting forces needed for each condition.

In order to make these readings, it is necessary not only to obtain measurements of the various factors but to obtain them from representative localities with which the forester is concerned. Therefore, simple sets of instruments are installed in shelters at various points in the national forests. Observers at each of these stations report daily the conditions recorded there to their respective offices where the fire danger meters are installed.

In time of high fire hazard the records will be wired to the regional office where a fire danger meter will also be installed. Preparations then can be made to supplement local fire prevention arrangements with assistance from the regional office.

Foresters themselves plan to use the meter as a guide in planning their fire work, so that they can be at the right place at the right time whenever extreme fire danger occurs.

The meters were developed last winter in the Denver office of the Forest Service by A. A. Brown, forester in charge of fire control, and Wilfred Davis, technical assistant.

In time and as the system becomes perfected, it is expected that fire danger ratings may become just as important to the plans of the vacationist as reports on conditions of roads or forecasts of the weather.

STAMP OUT FOREST FIRES WITH POSTER STAMPS!

Each Stamp in 4-Colors

You can now obtain 4-color Poster Stamps of The American Forestry Association's Forest Fire Prevention painting by the celebrated artist, James Montgomery Flagg. A reproduction appears on the front cover of this issue.

These stamps, — a sample in black and white is reproduced above in the actual size of the stamp — are available in sheets of 100 at $1.00 a sheet. They are ideal for use on letterheads and envelopes, and each sheet purchased and used will mean that 100 individuals have been appealed to directly in the immediate fight to "Stop forest fires before they start." Stamp out as many fires as you possibly can this spring and summer by using Forest Fire Prevention stamps.

Send your order TODAY.
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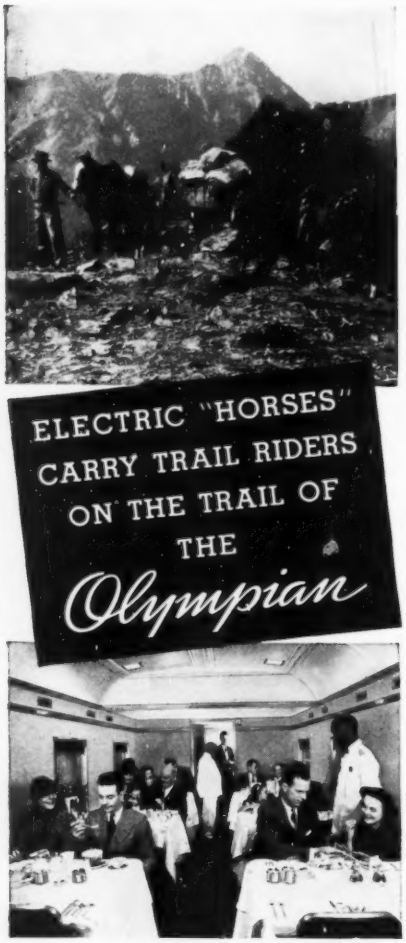

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ARKANSAS' THREE LINES OF DEFENSE

By Charles A. Gillett, State Forester

Where mechanics are concerned, the forest fire fighting organization in Arkansas is similar to those operating in other states—a system of lookout towers connected by a network of telephone lines with rangers and guards on the ground. Six CCC camps are scattered throughout the state to bolster the efforts of the regular personnel.

This trained force, however, is not Arkansas's first line of defense against forest fires. It forms its second line of defense, sandwiched between first and third lines composed entirely of private citizens who regard a forest fire as a public calamity, against which society must arm itself.

Acting as a first line of defense the greater part of the citizens within protected areas are consciously and aggressively careful with fire in the woods, and urge others to be careful. Such citizens spread the gospel of forest conservation by word and deed. In addition, they lend whatever physical support they can in actually fighting fires.

Under ordinary circumstances the second line of defense, composed of regular employees of the Forestry Commission and the CCC camps, can mobilize and go into action immediately when a fire is reported—and most fires are thoroughly extinguished before volunteer assistance can be obtained.

In times of severe hazard, when there are many fires burning, the volunteer assistants have ample warning and without any particular organization a strong third line of defense materializes. In fact, the volunteer assistants put in twice as many man-hours of fire fighting as the CCC camps during the last three-year period. In protection units where there were no CCC camps the volunteer fire fighters supplied a large part of the manpower and enthusiasm that confined the fires of last fall to what, in view of circumstances, was an amazingly small area.

At the end of the fire season in 1938—an unusually warm and dry three month period—it was revealed that slightly more than one-half of one per cent of land under fire protection in the state had burned over, while on unprotected land from twenty to twenty-five per cent burned. The protected area was greater than the unprotected area since it consisted of 12,000,000 acres as against 8,000,000 unprotected acres. Expressed as a proportion, the damage was forty-one times greater on unprotected land. Thus it is obvious that the reduction in loss was largely, if not entirely, due to protection efforts.

It should be borne in mind that there were no funds to pay for emergency fire fighting labor and that the volunteer assistance was given without thought of any immediate compensation. As a matter of fact, it is unlikely that any small hourly wage would have been sufficient incentive to attract the type of assistance that was supplied.

The attitude of the members of the Sugar Loaf Forest Protection Association is illuminating, though not yet characteristic of the whole state. Sugar Loaf Mountain, which covers an area of 80,000 acres, stands in the center of a valley and extends about 1,000 feet above the valley floor. Prior to the formation of the Association six years ago the woods which completely clothe Sugar Loaf were allowed to burn each year. Fires, started at the base of the mountain, burned to the peak unless progress was halted by rain. During the fall season it was not unusual to see the mountain ringed by a line of fire creeping inexorably up the steep slopes.

Just as its bulk dominates a large area of land, so Sugar Loaf plays a major part in the thought processes of the folk who live at its feet. The mountain has long been a favorite area for picnickers and hikers, and its slopes have echoed the shrill cries and whispers of boys bent upon "adventure." It affords grazing for the cattle of the region during the spring and early summer months, and mine supports and timbers have been removed in large quantities from its slopes to find their last usefulness beneath the ground in the coal mines which dot the valley.

Inspired by educational efforts of the State Forestry organization, a group of enthusiasts decided that Sugar Loaf should burn no more. Led by Mallie Douglas, a rural mail carrier, they formed the Sugar Loaf Forest Protection Association with the aim firmly established of preventing further damage to the forests of the mountain by fire.

The organization has been amazingly successful. During the past eight years less than 500 acres on the mountain have burned. This record was established despite the fact that the mountain is completely circled by highways, a main line railroad runs around one-half of its perimeter, and the mountain is used, as always, by numerous hunters and picnickers.

The membership has grown from five to over 700 men and boys, organized in twenty-one fire fighting crews, each led by a captain. It now owns and operates twenty-five miles of telephone line and maintains about 100 permanent, durable fire prevention signs. And most surprising of all, the enthusiasm of the Association's members has increased rather then diminished as the years passed.

This is the dramatic side of the work of the Association, but its other work, while quieter, is just as effective and even more lasting. Working on the idea that a fire prevented does no damage at all, the purpose of the club is to educate all those who live around the mountain, or who use the forests on it to a realization of the damage resulting from fires and to convince them that they must be careful with fires in the woods. The Association appeals to all hunters to protect the game by protecting the forests, which supply its food and shelter, from fires. It appeals to cattle owners to improve the grazing by protecting the forests from

fire. It appeals to the casual smokers along the edge of the mountain. In effect, the Association says that if we must we will fight all fires necessary to save the trees on Sugar Loaf, but we would much rather have no fires to fight.

The Association had already proved its value to all the folk who live around the mountain. Previous to its organization one had to go from Midland, right at the foot of Sugar Loaf Mountain, twelve miles over to Poteau Mountain to pick blueberries. After fires had been kept out for two years 500 buckets of blueberries were picked on Sugar Loaf and it is expected that as long as Sugar Loaf is protected this yield will be increased from year to year. A stream that dried up completely every year previously had seven water holes in it after only two years of fire protection—and during one of the driest summers on record.

The example set by the Sugar Loaf Forest Protection Association has resulted in the formation of fifty-four other forestry clubs in the state, with a total membership of some 1200 men and boys. Naturally, the clubs have not been uniformly successful. They have, however, assisted materially in arousing public sentiment for a prompt and vigorous effort to stamp out man-caused forest fires in Arkansas.

Forest Fire Control in the Northwest

(*Continued from page* 167)

bathing the mountains in fire and leaving whole communities desolate. It is too late for remedial measures after the red demon has grown to full power. Then we can only work and pray through the long stubborn battle till the last flame is whipped into nothingness or blessed rain has come to our aid.

The time for telling action is before the fire season is on us and the action consists of *preparation;* preparation for fighting the fire before it starts! Lookout and guard stations, roads and trails, equipment and money to hire men to catch the fire before it has hardly begun. Once we man our forests with trained men adequately equipped and properly located, then we can stamp out fires before damage is done and conserve our natural wealth for pay checks by intelligent use and foresight instead of sacrificing it to the Red Gods of smoke and destruction.

Forestry, largely the foundation of our social and economic welfare here in the Northwest, is ninety-five per cent dependent upon fire control. This then must be the answer to the question, what does fire control mean to the Northwest?

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Challenge to Federal Leadership

(*Continued from page* 200)

number of fires are occurring? The answer, I believe, is the failure of the federal government to concentrate and carry through on the fire problem. Instead it has diverted its energies and funds to other conservation activities until they have become spread over such a wide and diversified field that national forest fire control has lost its proper place of first importance to conservation progress.

In this hurly-burly of federal activities, the burden of national fire control outside the federal forests, parks, and other reservations has been left largely with the states and private timberland owners to cope with as best they can. And this despite the fact that since passage of the Clarke-McNary Act the problem of public-caused fires has been accentuated almost one hundred fold by increased automobile travel and recreational use of the forests. In a desperate effort to deal with the menace, states and private owners have increased their cooperative expenditures under the act to $5,500,000 annually. In addition, many local organizations formed wholly for protective purposes are supplementing their efforts by substantial expenditures every year. In my own section of the Pacific Northwest, for example, forest owners are spending some $1,500,000 annually to protect their forest properties against fires caused largely by the public.

As against expenditures of at least eight million dollars annually by the states and private owners, the federal government as a cooperator under the act is contributing only $2,000,000. Prior to 1939 its contributions were nearer $1,500,000 annually. In the light of the fact that the act authorizes the government to match state and private expenditures and that there has been no apparent difficulty in getting federal funds for other conservation work, the comparison speaks for itself.

Had the different conservation agencies of the government singly and collectively stressed the urgency of solving the fire problem nationally as aggressively as they have stressed some other projects, I believe that Congress would have made the necessary funds available and the problem would now be well on the way to solution. And as a corollary of first importance, national conservation in this country today would be on a solid foundation rather than on a temporary one where it must continue to remain as long as a forest fire is breaking out somewhere in the United States on the average of every three minutes throughout every year.

The federal agencies have performed highly commendable work in protecting the national forests and parks, but the fire problem is so national in scope, so fundamental to all conservation that federal leadership—if it is to be such in fact—must recognize and meet its larger protective obligations to its citizens and its states to aid them in dealing with a national menace that constantly threatens life, property and natural wealth. Without that leadership, I fear the problem will never be solved and that conservation in this country will be more of the spirit than of the substance. Experience under the Clarke-McNary Act indicates that adequate protection can be provided for state and private lands not now adequately protected by an expenditure of only $18,000,000 a year. Considering the resources at stake, the human values involved, and the influence reasonable security from fire would exert in promoting better conservation by the states and their citizens, this is cheap insurance indeed.

There are many of our citizens conscientiously endeavoring to engage in conservation. In doing so they are performing a public service and entitled to public aid and encouragement. A federal attitude that holds up the private forest operator to public scorn and at the same time falters in helping to remove the handicaps and hazards of forest fire is a deadening one to private conservation initiative. If conservation is to become part of the everyday lives of our people government's attitude must be one of cooperation in solving the problems that today surround every non-public conservation undertaking. But whether the undertaking be private or public, this cooperation has its point of beginning in the control of forest fires.

I believe that the federal government

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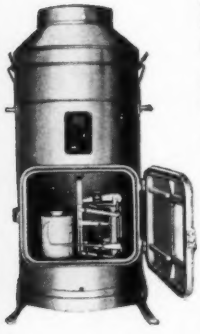

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should share half the cost of protection, which would mean an expenditure of some $9,000,000 annually. In addition, it should set up a reserve fund to meet the special fire emergencies which we read of so frequently in our newspapers. If by aggressive leadership and bearing one-half the cost the government still is unable to bring about national security against an enemy more destructive than armed invasion, I believe its expenditures might properly be increased.

To me it is little short of tragic to permit the fire problem to lose its place of first importance in our conservation program. The problem is not exclusively a forest one. Too often we think of it merely in terms of timber lost and young growth destroyed. Fires do take a terrific toll of useful timber and bring to sudden naught man's and nature's efforts to reforest our land and preserve its fruitfulness. But more often, the loss of other values is far greater. I refer to loss of life and property, industry and employment, environment for recreation and wildlife, protection of soils and waters, the influence of forests upon climate and habitation, and the spiritual values inherent in nature's beauty.

These are the things that to me make conservation so tremendously worthwhile and control of forest fires so tremendously important.

For a great nation, embarked upon conservation, can there be a greater challenge to leadership and action than that flung at it every year by 172,000 forest fires?

"Calling All Fires"

(*Continued from page* 218)

in Trenton and a fifty-mile range is necessary to reach the northern control tower. Fifty watt transmitters are installed at these points primarily to provide a very high signal strength at state headquarters where the noise level is high.

In northern New Jersey, where the terrain is semi-mountainous, intervening ridges have little effect on transmission, and lower powered transmitters could be used with perfect satisfaction although standard fifteen-watt units are in service. Mobile communication in this area brings to light much remarkable and interesting data. Mobile units which have reliable transmitting ranges in the southern and central sections of fifteen-twenty miles often are received over fifty-mile ranges in the northern section and are practically certain to reach one or more towers even though these mobile units are located in the valleys and transmission takes place over numerous high places.

It is impossible, in a few hundred words, to go very deeply into the many advantages of this type of fire communication; neither can there be covered the advance in efficiency in fire control which has resulted from the use of this modern means of communication, but here in New Jersey it would appear as though this method of communication and liaison has very definitely had its place in a steady reduction of the average size fire in this state during the past two years, and this alone has fully justified the cost.

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Ask For
CATALOG OF TREE SURGEON'S SUPPLIES

New England

(*Continued from page* 180)

They can initiate a plan of training which will improve the performance of the wardens. Also, they can make sure that each fire shall be handled by the best man available whether he is the local town warden or not.

The federal Forest Service will have CCC and WPA crews and it is seeking from Congress a deficiency appropriation with which some other labor may be hired. Federal man-power and equipment can be used to help the states fight fire, but not at the call of hundreds of town fire wardens. If the state foresters want to get the most out of federal help, they should seek the authority to direct fire control and not leave the Forest Service to deal with town fire wardens. Will New England recognize that its state foresters must lead? Or will it take a chance and trust to the old system of independent town wardens?

Tomorrow's Fires

(*Continued from page* 216)

areas on which the students plant a thousand pine seedlings each year under the supervision of a forest ranger. Mississippi offers ideal climate conditions for tree growth and these school plantations provide very accessible demonstration plots of the possibilities in reforestation. The children have a personal interest in these trees and watch their growth eagerly. In some instances this interest is even extended to the individual tree as each child's name is placed on a tag fastened to a stake in the ground beside a tree.

In all the school programs an effort is made to teach the children the principles of good forestry practices.

Backed by Rotary Clubs, newspapers and business firms and trained by the United States Forest Service, these school children are beginning to realize that their heritage is conservation and rebuilding—that they must bridge the gap between yesterday and tomorrow—that destiny has placed in their hands the task of beginning a new and better era in the economic history of the South.

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Fire, Floods, and Erosion

(*Continued from page* 176)

Over a six-year period, the burned plot has shed almost exactly 100 times as much water as the plot in virgin woods; soil losses have been more than 800 times as great.

In this country millions of acres of farm woods, like the damaged plot at Statesville, are deliberately burned over every year. Despite the constant warnings of forestry agencies, thousands of farmers persist in the belief that annual destruction of undergrowth and litter makes an open stand of timber suitable for grazing. Others maintain that burning is necessary to control the spread of insect pests, although this has been seriously challenged by many entomologists. In any event, the accelerating effect of burning on erosion and runoff is scarcely open to question. It has been observed by foresters for years and is now confirmed by scientific experiment.

Ordinary farm woods, however, differ from experimental plots in one important respect. Instead of pouring soil-laden water into a measuring vat, they discharge it directly into a natural drainage system that may extend over thousands of acres. Where woodland burning is practiced on a wide scale, large amounts of erosional debris are spread over lowlying lands, deposited along stream channels, and piled up in reservoirs. Underground supplies of water are sometimes lowered as normal infiltration is impaired; and flood crests may rise higher as runoff increases. In other words, this supposedly beneficial practice can have a damaging effect far beyond the area actually put to the torch.

To conserve the rich resources of this country and restore some degree of order in the inter-relations of earth and climate, positive action is required along several definite lines. Adjustments in the pattern of land use are needed on fully sixty per cent of our total farmland area. Large engineering works are necessary for protection against floods, especially at strategic points in the lower courses of our streams and rivers. In the last analysis, however, the woodland cover that now extends over approximately thirty per cent of the nation's land surface is probably our most powerful single bulwark against excessive soil wastage and runaway water. Even if no timber values, no esthetic values, and no recreational values were involved, this system of natural land defense would be worth protecting at almost any cost simply as an aid in soil conservation and flood control.

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Common Defense

(*Continued from page* 190)

faced with frank recognition of the magnitude of the forest protection task,—in terms of nation-wide cost, at least $18,000,000 each year.

4. The greatest problem of all is to dramatize the need of forest protection to the American people. Technical and mechanical facilities for fire detection, prevention and suppression are of a high order. But too many people are still indifferent to the forest fire hazards and their public and individual consequences.

Above all, we need in our country the popular inspiration and conviction which,—as in other and more experienced countries,—will lead to a nation-wide determination that forest fires are not a regrettable local incident but a preventable national menace.

Outdoor Recreation

(*Continued from page* 185)

Provision for adequate protection must be fitted to the use to be made of areas. Where smoking or campfires are permitted, hazards must be reduced to a practical minimum or the probability of fires starting must be expected. Reconciling these risks with inadequate finances for personnel and protection facilities is an ever-present problem of administrators of recreational areas.

The loss of tourist business and, therefore, of normal employment, by local establishments during and following any large fire is a well known consequence. The recreation business in America is a major industry and forms the chief source of income either directly or indirectly of a large part of the local population in many sections of the country. This source of income may be completely wiped out either temporarily or permanently by fire. Traveling through an area of burned snags is depressing and there is little incentive for vacationists to tarry in a ruined forest. The public avoids such areas.

Public recreation in the forests of America is becoming an increasingly important social function of federal, state and municipal governments. There is still a vast potential area of forest, which, if properly protected from fire, will adequately meet the nation's need for both outdoor recreation and timber production. Adequate financing and planning of protection provisions must keep pace with use and development of recreation areas, or the threat of destruction of the very features which make the areas attractive, will be ever present.

YOU CAN HELP

You can help in the 1939 forest fire prevention campaign by placing copies of this special issue of AMERICAN FORESTS in the hands of others. Give copies to your friends, your children's school, the library in your community. Your Association will mail them direct for you—at the regular price of 35 cents a copy.

Your Opportunity To Pay Tribute To Fire Heroes

FOREST fire fighting in this country is the most arduous and hazardous task which a forester, or a forest protective employee is ever called on to perform. Not only may an individual's life and limb be endangered but oftentimes sole responsibility falls upon him for hundreds of thousands of dollars worth of public resources as well as for the safety of other fire fighters. Fire fighters are often called on to display in the highest degree qualities of courage, judgment, quick thinking, and coolness. These qualities heretofore have been formally recognized in some specific cases merely by letters of appreciation and commendation from those higher in authority. It is proposed hereafter to recognize outstanding cases of personal heroism in fire fighting by the award of a bronze medal to be known as the American Forest Fire Medal.

ELIGIBILITY

Any person may be eligible for the Award after satisfactory evidence is presented that he has performed an act worthy of consideration for such an award within the boundaries of the United States, Canada, or Mexico. Evidence of such acts of heroism or bravery, judgment, initiative, alertness and coolness on an actual forest fire shall consist of sworn statements from at least two eye-witnesses of the act, or from persons personally familiar with the entire circumstances of the act. The award may be posthumous. The Board of Award consists of:

J. P. Kinney, Chairman,
The American Forestry Association

Tom Gill,
Charles Lathrop Pack Forestry Foundation

T. S. Goodyear,
Association of State Foresters

John D. Guthrie,
Society of American Foresters

John B. Woods,
National Lumber Manufacturers Assn.

ESTABLISHMENT OF FUND

In order to establish this Award on a permanent basis, a foundation of not less than $3,000 is necessary. Contributions totalling $2,153.00 have already been received. It is believed that foresters, forestry, park, and all forest protective associations, as well as conservation and wildlife groups will welcome the establishment of such an Award and will want to contribute towards its foundation. Contributions of $1.00 or more from individuals and larger amounts from organizations will be welcomed. Contributions should be sent to:

THE
AMERICAN FORESTRY ASSOCIATION
919 17TH STREET, N. W.
WASHINGTON, D. C.

Fire Under the Midnight Sun

(*Continued from page* 169)

country are strangely missing here in a danger region of 250,000,000 acres—an area one and one-half times as large as all national forests in the United States.

With fire so prevalent, the writer was not astonished to find a fast-growing sentiment among local inhabitants in favor of intensive, systematic federal fire protection. The desire for fire protection has been sharpened by a growing shortage of fur bearers, devastation of range lands, shortage of sawtimber and fuelwood within easy hauling distance of settlements, and more irregularity in the flow of streams used in placer mining. Complaints about the smoke nuisance from an increased tourist trade and the expanding airplane service, are also strong contributing factors.

Alaska has approximately 400,000 square miles, or roughly 250,000,000 acres of vegetative cover needing fire protection. This cover is divided into: (1) approximately 40,000,000 acres of fairly dense forest cover of small size white spruce and white birch; (2) 110,000,000 acres of open woodland and interspersed grasslands; (3) 100,000,000 acres of tundra. The tundra furnishes the food for the reindeer, which form the basis of the Eskimo economy. The timber of the first two classes is essential to the development of the mining industry and the settlement in this far northern country. All three classes are valuable for wildlife habitat, for potential domestic stockraising, and for help in conserving the scant water runoff. Also, all three help to make up the unusual natural beauty that Alaska possesses.

This devastating agency of fire should be brought under control at the earliest possible date. A well-planned, far flung fire protection organization of crusading experienced men, with good facilities and equipment, will preserve the natural beauty and wildlife of this last extensive wilderness on United States soil, and conserve the natural vegetative resources for present and future economic use.

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FORESTRY IN CONGRESS

By G. H. COLLINGWOOD

Government reorganization has again loomed into the foreground, and on March 8 the House passed the Warren-Cochran bill, H. R. 4425, by a vote of 234 to 148. The bill now awaits action in the Senate. It would give the President until January 21, 1941 in which to formulate plans for such governmental reorganization as he believes necessary to reduce expenditures, increase efficiency or eliminate overlapping and duplication of efforts by the several executive departments.

Each plan must be submitted to both Houses on the same day, accompanied by a statement showing the expected economies. After sixty calendar days, the plan will become effective unless both Houses shall pass a concurrent resolution stating that it is not favored by Congress. A concurrent resolution, being "a means of expressing fact, principles, opinions, and purposes of the two Houses," is not subject to Presidential veto.

A motion proposed by Representative Mott of Oregon, to exempt the Forest Service from reorganization, was voted down 148 to 101. Among those eighteen agencies which the act would not affect, are the Civil Service Commission, the Engineer Corps of the United States Army and the General Accounting Office.

Aside from the named exemptions, no specific reference is made to any bureaus or government agencies, and the bill does not provide "for changing the name of any executive department or the title of its head, or for designating any executive agency as 'Department' or its head as 'Secretary'."

The Department of the Interior Appropriation bill, H. R. 4852, entered the House on March 8 with $11,436,420 for the national parks and monuments. This is $5,905,425.29 less than the appropriations for the current fiscal year. The sum is taken largely from the Blue Ridge and Natchez-Trace Parkways and the construction of roads and trails, although the former would still have $4,000,000 and the latter $3,500,000.

An increase of $10,000 for forest protection and fire prevention on national parks brings the total to $120,000, while the administration and protection of forests on the Indian lands is increased by $21,500 to a total of $501,500.

An increase of $100,000 is extended the Division of Grazing whose total appropriation of $1,000,000 is divided into $750,000 for salaries and expenses, and $250,000 for construction and maintenance. In addition there is another item of $60,000 for range improvements outside grazing districts.

Hearings on the Agricultural Appropriation bill closed on March 3, that the bill might be reported to the House on March 16. On March 2 a group of public representatives requested the Budget recommendation of $2,000,000 for cooperative forest fire protection be increased to $2,500,000 as authorized in the Clarke-McNary Act. They also urged $600,000 be added to the sum of $378,489 previously approved for Dutch elm disease eradication.

Before concluding hearings on H. R. 2990, to make the Civilian Conservation Corps permanent, on February 24, Representative Mary T. Norton, chairman of the House Committee on Labor, questioned Brigadier General George P. Tyner regarding the desirability of including military training in the Corps. Before subjecting himself to questions, during which he explained to the committee that the CCC is primarily an organization for the performance of labor, the General stated:

"The War Department has never advocated military training for the Civilian Conservation Corps, for many reasons, but if competent authority decides that such training be given, the War Department favors limiting it to disciplinary training and simple drill movements only, and no weapons to be involved except possibly for gallery practice as a recreational feature. All training to be in the camps and carried on outside project work period and concurrently with camp routine such as reveille, falling in for work, retreat, Saturday A. M. periods, etc."

Referring to H. R. 4170, for control of stream pollution as introduced by Representative Karl E. Mundt of South Dakota, and the hearings of March 3, before the House Committee on Rivers and Harbors, Senator Clark of Missouri told the Senate on March 8, that proponents of a drastic stream-pollution bill received scant courtesy on the first day of the hearings in the House. Accordingly the Senate Committee on Commerce postponed action on Senator Barkley's S. 685 and extended hearings to S. 1691, as introduced by Senator Clark. The Clarke-Mundt bills would hold the Corps of Army Engineers responsible for control of stream pollution, while the other bills place responsibility in the Public Health Service and follow the pattern of last year's conciliatory Barkley-Vinson bill which the President vetoed for fiscal reasons. The Barkley program is believed to have the approval of the President and the National Resources Committee.

CONSERVATION CALENDAR

Important Bills in Congress with Action February 11—March 10, 1939

APPROPRIATIONS

H. R. 2868—TAYLOR, Colorado—First Deficiency Appropriation Bill. Passed House January 23, 1939. Passed Senate amended February 6, 1939. Conference Report agreed to in Senate February 20, 1939; in House March 9, 1939.

H. R. 3743—WOODRUM—Independent Offices Appropriation Bill. Appropriating $1,898,512,769 to operate independent government agencies for the year beginning July 1, 1939. Passed House February 8, 1939. Passed Senate amended February 22, 1939. Sent to conference February 23, 1939. Report agreed to in Senate March 2, 1939. Further conference requested, March 7, 1939.

H. R. 4852 — TAYLOR, Colorado — Department of the Interior Appropriation Bill. Reported from the Committee on Appropriations (Report No. 161) March 8, 1939. Under consideration in the House March 9, 1939.

EDUCATION

S. 1609—MEAD—To provide for cooperation with the states in the promotion of conservation education in the schools and universities, and to provide for cooperation in the preparation of teachers, supervisors, and directors of conservation subjects on the natural and human resources. Introduced February 27, 1939. Referred to the Committee on Education and Labor.

GOVERNMENTAL FUNCTIONS

S. Con. Res. 5—BANKHEAD—To continue the Joint Committee on Forestry through the 76th Congress. Introduced February 16, 1939, and referred to the Committee on Agriculture and Forestry.

S. 1706—BYRD (H. R. 4893—ANGELL)—To provide for reorganizing agencies of the Government. Introduced March 9, 1939. Referred to the Select Committee on Government Organization.

H. R. 4425—COCHRAN—To provide for reorganizing agencies of the government. Introduced February 23, 1939. Passed House March 8, 1939. Referred to the Senate Select Committee on Government Organization.

NATIONAL FORESTS

S. 26—WHEELER (H. R. 3371—O'CONNOR)—To empower the President to create new national forests and add to existing national forests in Montana. Passed Senate February 16, 1939. Referred to House Committee on Public Lands February 17, 1939.

S. 1546—MCNARY—To provide that moneys received from the national forests and paid to the states for the benefit of the counties in which such forests are situated may be expended for purposes other than public schools and public roads. Introduced February 23, 1939. Referred to the Committee on Agriculture and Forestry.

H. R. 4833—COLMER—To revise the method of determining the payments to be made by the United States to the several States with respect to conservation lands subject to the jurisdiction of the Department of Agriculture.

NATIONAL PARKS

S. 1511—BONE—To provide for the acquisition by the United States of lands not in federal ownership within the Olympic National Park. Introduced February 20, 1939. Referred to the Committee on Public Lands and Surveys.

H. R. 4635—ENGLEBRIGHT—To transfer certain lands from the Sierra National Forest to the Yosemite National Park in California. Introduced March 1, 1939. Referred to the Committee on the Public Lands.

H. R. 3794—GEARHART—To establish the John Muir-Kings Canyon National Park, California. to transfer thereto the lands now included in the General Grant National Park. The Committee on Public Lands has scheduled a public hearing for March 15, 1939.

TREE DISEASES

S. 1718—WALSH—For the eradication of the Dutch elm disease in America. Introduced March 7, 1939. Referred to the Committee on Agriculture and Forestry.

WATER AND STREAM CONTROL

S. 685—BARKLEY—To create a division of water pollution control in the U. S. Public Health Service. Report without amendment (Report No. 120) from the Committee on Commerce March 1, 1939.

H. R. 4170—MUNDT (S. 1691—CLARK, Missouri)—Providing for Army Engineers and the U. S. Public Health Service to coordinate and cooperate with state activities to prevent pollution of navigable streams. Introduced February 15, 1939. The Committee on Rivers and Harbors held public hearings on this bill March 3 and 6, 1939.

H. R. 4314—MANSFIELD—To provide federal aid to states in the control of water pollution, to create a division of water pollution control in the United States Public Health Service. Introduced February 23, 1939. The Committee on Rivers and Harbors held public hearings on this bill March 3 and 6, 1939.

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Fire or Forestry—South's Problem

(*Continued from page* 164)

is shown throughout the entire South. As a member of the National Forest Reservation Commission my attention has been directed to a characteristic example on the Osceola National Forest, in northern Florida. Less than ten years ago the federal government bought a considerable acreage to add to that forest for about $5 an acre. In the meantime, the land has been protected from fire at an annual cost of about six cents an acre, and recently, I am told, the land with its growing forest of pine was valued at $17 an acre. In other words, for sixty cents an acre, plus the cost of holding for ten years, the value of the property increased from $5 to $17.

At the same time, I am told that about 160,000 acres on this same national forest furnished employment for 502 individuals. Much of the work was connected with the production of turpentine and rosin, but the production of pulpwood is a factor of increasing importance. Wages amounting to $265,000 were paid the workers, and with their families and dependents they served to support some 1,400 persons. While this particular example is one of federal ownership, there are equally convincing examples of profitable employment on private lands in the states of this region.

This problem is national in scope and the application of good principles of forest protection is universal. The prosperity resulting from better forest protection is bound to be reflected in larger purchasing power, increased ability to pay taxes, and greatly improved living conditions. For these reasons and others, the federal government has embarked on a program of cooperation with the several states. By increasing this financial participation so that all forest land may receive adequate protection, this nation will take a big step forward in its march toward increased prosperity.

Fire Over the Lake States

(*Continued from page* 172)

estimate that they should run from about four to six cents an acre. In other words, instead of spending less than $1,500,000 a year the region should be spending nearer $2,500,000. Increased federal assistance is needed to make this higher figure possible. To meet the situation not only in the Lake States but in other parts of the country, the present authorization for federal cooperation under the Clarke-McNary Act should be raised materially and actual appropriations brought to the full amount of the authorization as soon as possible. Past experience in reducing losses through increased expenditure indicate unmistakably that this would be a paying investment. Greater federal assistance, however, is needed to facilitate further progress.

Forests are a factor of major importance in the economic and social life of the Lake States. Large areas of land, especially in the northern parts of the region, are of little or no value for other purposes. The financial solvency, and even the very existence of many a community, depends on the perpetuation and utilization of its wild-land resources. The first step in restoring unproductive areas to productivity, in safeguarding existing stands, both of young growth and merchantable timber, and in encouraging the practice of more intensive forestry is obviously to reduce the fire hazard to a minimum. Control of fire in the forests is fully as important as on the farm or in the city, and in some respects perhaps even more so because of the long time necessary to replace the forest. In addition to the measurable financial loss resulting from forest destruction are the intangible but none the less important losses in recreational values, in the influence of the forest upon climate, streamflow, and erosion, and in the impoverishment of communities primarily dependent on the forest for their existence.

Michigan, Wisconsin, and Minnesota once produced some of the finest pine and hardwood timber this country has known, and for many years their cut of lumber exceeded that of any other region. History may not repeat itself quite to the extent of duplicating that record, but there is no reason why with fire protection and improved management the forests of the Lake States should not maintain wood-using industries of major significance locally and at the same time contribute substantially to the nation's supply of an essential raw material.

From the recreational standpoint the forests are also a national asset of great value because they afford the only attractive and readily accessible playground of adequate size to take care of the dense population in the states to the south. Their great economic and social potentialities will not, however, be realized until fire is brought under control, and to this end increased federal cooperation is essential.

THE AMERICAN LEGION SPEAKS

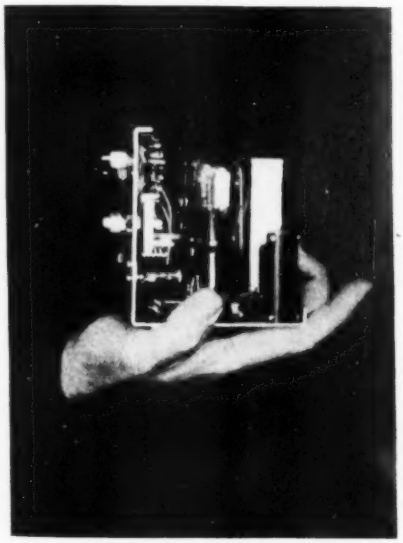
"Long interested in conservation and upbuilding of our national resources, the American Legion in its last national convention formally pledged support to a constructive program to reduce fire losses and to restore and protect our forests. . . . The American Legion joins other conservation minded organizations in support of the movement to which the American Forestry Association has contributed so much."—From telegram signed by Stephen F. Chadwick, National Commander, the American Legion.

Evolution of Fire Fighting Equipment

(*Continued from page* 207)

its practicability. The latest novelty is a machine, mounted on a truck, which employs dry ice as a pressure medium and throws a good stream of water without the need of a pump.

The incorporation in the fire control system of motor-driven carriers for transportation of men, equipment and supplies has followed step by step the rapidly advancing automotive industry. As the great road and truck trail systems were extended into the forested areas of the country, the automobile began to supplant the horse. Thousands of trucks are now in the service of fire control. These are usually three-quarter ton or one and a half ton, and in most instances the bodies are designed for this special use and compactly arranged for the accommodation of fire fighters and equipment. Much thought has been given to the development of trailers, some of which carry such difficult loads as a heavy tractor and plow. Since pack animals are still essential in certain remote sections, special trucks have been designed to carry mules to the nearest road point to a fire. The latest of this type carries nine pack mules with full equipment and the packer.



This small ultra high frequency radio, weighing but six pounds, and with two-way voice transmission, is the latest to be employed by government forest fire fighters

Control line builders have been many and diverse. The process of clearing, digging and scraping, which fire line construction involves, presents a challenge to mechanically minded men and provokes thought, invention and endless experimentation. Most designs and tryouts utilize the tractor as the power unit which either pushes or pulls some heavy attachment that digs, rips, knocks over, or shoves aside the material which must be removed.

Tractors were in general use but their special utility for fire work had not been discovered when, in the late twenties, a few inquiring minds began working on the trailbuilder idea. This scheme, deriving no doubt from the road-grading devices of the time, involved a large strong blade mounted obliquely in front of the tractor with means for raising and lowering in operation. A few years devoted to the process of trial and error produced a powerful machine full of promise for fast control line construction and even direct work along the hot burning edge of a fire. From this time on the tractor-pushed-blade scheme received wide acceptance and, as year by year buts were removed, new methods of handling were introduced and the blade and its uses greatly varied. Today, in many sizes and forms, we have the "trailbuilder," the "bulldozer," and the "brushbuster." This technological development offers a wide field for the future if we can prevent the urge toward bigness from hampering efficiency.

Horse-drawn plows have been used for years in fire line construction. In some regions they still fill the need. But with the advent of the tractor large plows were designed and tried out. Today there is a wide variety of both the disc and the middle buster type which march along behind a tractor, and the whole outfit, operated by one man, does the work of many men.

Within the last year an entirely new type of power-driven, fire line building machine has arrived on the scene. It is known as the Bosworth trencher. In contrast to the other mechanized diggers, it had no precedent in other commonly used devices. The frame has the appearance of a wheelbarrow with two handles behind and a bicycle wheel in front. The engine, mounted in the center, drives a drum of small, swiftly whirling hammers which, striking the ground, carve out to mineral soil a shallow trench about fourteen inches wide. Though not mechanically perfected, its present production of good line per unit of time dwarfs that of hand laborers. Those working with the models now in operation speak of output of trench in terms of "chains a minute" instead of the usual low rates of output of hand-made trench. The machine is so small and light that when two of them are lashed in the bed of a pick-up truck, most of the space is left unoccupied. This means that the machine has a chance to arrive at the fire with the first men—which cannot be said of most of our machine tools. The trencher can be used on steeper slopes than the trusty horse and plow or the tractor-trail-builder.

The development at this stage is so rapid even the illustration of the trencher here reproduced does not show the latest design. The most serious obstacle is that there has not yet been found a source from which to obtain a sufficient

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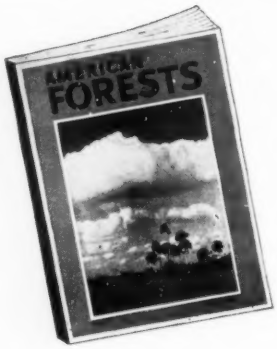

AN OPEN LETTER TO MEMBERS

April 1, 1939.

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Dollar figures do not tell of the young forests and vegetative cover destroyed on thousands of slopes and hillsides every year with resultant floods and soil erosion; nor do they tell of the pollution of streams, nor of the destruction of wildlife, nor of the loss of natural beauty and inspirational charm inherent in green forests.

To stop this tremendous drain upon our natural wealth, your Association is inaugurating a nation-wide forest fire prevention campaign. This issue of AMERICAN FORESTS magazine is a part of it.

You can help make this drive a success by suggesting membership in The American Forestry Association to your friends. Talk to them. Tell them of the need for conservation. Show them this issue of the magazine and urge them to support the forest fire prevention campaign.

Let each of us make it a point to bring in at least one new member. If we do, this drive is bound to be a great success.

Sincerely yours,

JAMES G. K. McCLURE,
President.

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In many sections back-firing done skillfully and quickly at the right moment is a most important suppression technique. The method has been used for scores of years but generally ineffectively and often disastrously. The match or torch in hand was usually the igniting tool. Through study of principles and devices used in industry and in warfare, there has been much improvement in backfiring, and today most fire control agencies are equipped with suitable tools. There are several types of liquid gas torches using commercial gases under pressure but, at present, the most effective instrument appears to be the recent development of a man-packed flame thrower which pumps a highly aerated stream of Diesel oil or kerosene across a lighted wicking, thus spreading flame to all fuel touched.

The potentialities of the use of aircraft in the many activities of fire control is a fascinating subject, and it is always open season for those of imagination. For some reason thousands of good American citizens at one time or another have suddenly thought up the bright shiny idea of fighting forest fires from the air, and one could not count the zealous letters which have been received by the Forest Service in the last few years.

During the period 1920 to 1928 the Army Air Corps maintained an aerial patrol on the Pacific Coast and in the Northwest in cooperation with the Forest Service. The primary object here was detection. It was found, however, that this function could be more effectively performed by the fixed lookout system then developing. At present the Forest Service employs a great many planes, and the uses for fire control purposes divide themselves naturally into four broad activities:

First, is the detection of fires from the air. This is done following lightning storms, during periods of low visibility, and to reconnoiter blind spots during dangerous fire weather.

Second, is scouting large fires. An observer flies with the pilot making reconnaissance of burning area and informing the ground forces of the position and movement of the fire.

Third, is transportation of men and supplies to fires. In most instances this is done from points of labor and supply to landing fields nearest the scene of the fire. At present, however, the Forest Service has only sixty-six such fields. During the last three years there has been a marked development in the technique of dropping supplies and equipment from planes in flight. Materials of all kinds—pumps, hose, gasoline, canned goods, eggs and food of all kinds, radio sets, fire fighting tools, water, etc.—are dropped in different ways. In some sections materials are dropped free with specially prepared wrapping, but during the past two years the improvised parachute method has been about perfected.

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By the use of this technique hundreds of thousands of pounds of cargo have been dropped to remote fire camps.

Fourth, is direct attack from the air. This project was initiated two years ago, and because it is operating in an uncharted field of endeavor, is still in the experimental stage. The objective is to determine the feasibility of dropping some substance — water, foam, liquid chemicals, dusts, or explosives — upon small fires in remote areas and so affect the burning edge as to check or retard spread until the arrival of ground forces. At present a specially designed and equipped plane is used on this project, and much good work has been done in determination of type of materials and containers, in establishment of flying and bombing techniques, in the creation of bomb sighting devices and in the attainment of a high degree of bombing accuracy. With the further development of aircraft, it is believed that this may become an effective means in the future.

Efforts now being made in the field of hovering type aircraft give promise of the development of planes which will be much more usable for our purposes. The autogiro, due to its ability to land and take off in very restricted areas, could land men and materials in thousands of spots throughout the forested areas, such as flat ridge tops, small meadows, or clearings and canyon bottoms. Because of physical conditions the clearing and leveling of sites for landing fields for conventional planes is a very costly process, and such sites in the national forests are extremely scarce. But if a perfected hovering type craft were available, there would be no limit to the number of small landing fields which could be inexpensively prepared. In this way men and supplies could be gotten quickly to points at or very close to most fires, catching them in their incipiency. This thought and work looks to the future.

Many other fields of science and mechanics have yielded their devices to improve the effectiveness of forest fire control. Radio in its most modern form is in general use. The development of light weight, portable instruments has greatly increased the popularity of radio, and on the National Forests about 2,700 stations are in operation. Fire weather forecasting is being extended and improved—fire danger meters correlate weather and other data and gauge the fire potentialities of each day during the fire season. Exhaustive research and tests in laboratory and field are being made to discover the best fire extinguishing chemicals and their means of application for forest fire control has become a practical art. Many feel, in all modesty, that it may properly be termed a technology, even though a young one, and mechanization of the equipment of suppression which has been going on for about twenty years continues at an accelerated rate.

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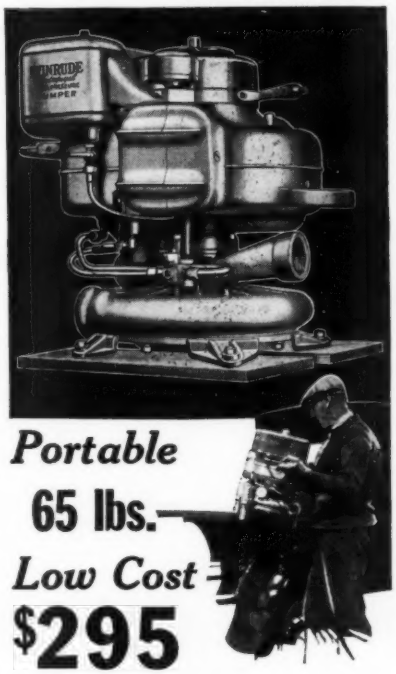

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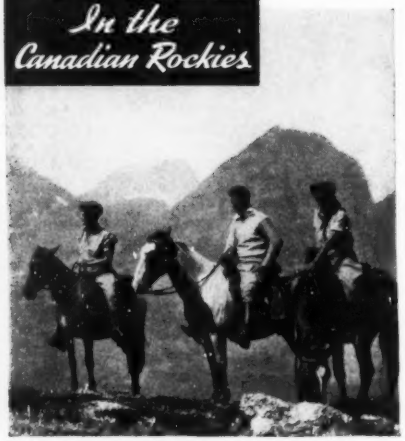

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—BUYS AND SELLS—
Western Timber Lands

The CCC as a Fire Fighting Unit

(*Continued from preceding page*)

But they learned. And they stuck. Soon the old timers, the seasoned fire fighters in the federal Forest Service, in the state services, with the logging outfits, saw that here was something new. Eastern kids, city kids, who less than a few months before had come into the western hills as pale, anemic, undernourished youths, were holding their own on many a fire front hell. They were raw but faithful. They quickly grew in body, mind and spirit. They showed they could be depended on. They had what it takes.

From then on, the forest rangers, the fire wardens, and the logger fire fighters began to take the CCC enrollee seriously. The higher-ups began to give their superintendents and foremen and then the boys some advance training in fire fighting, in using fire tools and machinery, how and when, and when not, to start backfires. They told them how fires behave at different times of the day, at different elevations and exposures, and what a wind may do to a fire; they were taught how to keep from getting trapped, how to look out for falling limbs and dead snags, how to get out of the way of boulders rolling down mountain sides, and the thousand of other techniques of the forest fire battle.

Here then was a mobile force, readily available, with trucks, tools, back-pumps and other equipment—a force eager and willing, a force under trained leaders, a force to be relied on. Perhaps they didn't have the staying power of the older fire fighter, but they had an eagerness, an enthusiasm, which the older man lacked. Perhaps the CCC had to have shorter work shifts, with more resting spells between, but they "came back" quicker.

They came to feel that they were a part of the fire fighting force, the protectors of the forest. They had vanquished the fiery host, they had won battles, and so confidence and self-reliance and woods wisdom came to many a boy for the first time in his life. He was no longer a kid; he had held his own with the rangers on many a fire front. He was a man.

When his two years were up, or before that, when he left the Corps and went back to New York, or to Ohio or to South Carolina, he took with him an experience which will be with him forever. He had become a man out there in those western mountains, on that big fire of 1934, or 1936, or 1938. He had helped keep fire out of the forest; he had an interest, a proprietary interest forever in those trees; he had a stake in America now.

But the Corps paid a high price for this advance. The boys paid it in Oregon, in California, in Wyoming, in Pennsylvania. A total of thirty-nine enrollees paid the supreme price of forest protection—they gave up their lives on the fire line. American youth from now on has indeed a stake in forest protection in the United States.

Thus the Civilian Conservation Corps has come to be the first line of forest fire defense. Advance fire training has been perfected, safety on the fire line means more—no brand-new, green boys are sent to the front. Now they know something about forest fire behavior. They know something of what may happen on a forest fire. The CCC is a recognized fire fighting unit throughout the country.

What of the future? What part should the CCC play in American forest protection when and if it becomes a permanent conservation labor agency?

It is my personal judgment that first, the Corps should be considered as reserve fire fighters, to supplement, but not to replace, the regular federal, state and private protective forces or organizations. They should not be looked on as the first line of fire defense but rather as an emergency or reserve force.

Secondly, they should not replace local labor, the local forest protective or cooperative guards, patrolmen, lookouts, or fire fighters, but should be a force supplemental or additional to regular protective units.

Thirdly, the members of the Corps—project superintendents, foremen, technicians, leaders and enrollees—should be given more and better advance training in forest fire fighting. This training should also include more and better CCC crew organization for fire fighting, to the end that when enrollees go to a fire, they may function efficiently and with the greatest degree of safety for members of the Corps engaged.

Lastly, every CCC company should receive advance forest fire fighting training, regardless of the type of camp or work being done. No one knows far in advance when a company doing wildlife work on the coast of South Carolina may be transferred to southern California and be called on to fight fire; when a soil erosion control company in treeless west Texas during the winter may be transported the following spring to the Douglas firs of Oregon and be called on to battle a raging forest inferno. The demands of conservation work often mean surprising moves for CCC companies.

Great as has been the contribution of the CCC enrollees to forest protection in this country, great as has been their effort to save America's natural resources, the imprint left on their minds and bodies, yes, on their souls, by this life in and fight to save the forests has been as great and as lasting. In their young bodies, but even more in their impressionable minds, have been planted seeds of tolerance, self-reliance, hardihood, love of the forest and its wisdom; and withal, they are better citizens of this great Democracy.

50,000 Firebrands

(*Continued from page* 179)

of this national menace, you may be sure it will be well lit for all to see.

Now, as to the solution: Had I minimized the seriousness of the situation, this would be easier to discuss; but the worse the situation we are in, the more decisive must be the selection of some most promising way out. My proposal is to center nine-tenths of our effort—if fire prevention is nine-tenths of forest perpetuation—upon the definite task of arousing the American people to fire consciousness.

We continually overlook what is more urgent and much harder to accomplish —the eradication of a national propensity to set the woods on fire. We divert our own and the public's minds from this by a scattering campaign for everything else.

Even in our campaign against fire we make people visualize it as their enemy. This is ineffectual and probably leads to support of others' activities. It may reduce the sum of carelessness, but, after all, it only sprays and quarantines, as it were, indirectly and aimlessly against the fostering of a blight. It does not operate in time and place to arrest anywhere near enough of the 172,000 hands that fire the forest every year.

To do this we need a consciousness that says to the offender, "Thou art the man!" Our problem is not a fire-hunt but a man-hunt; before the fire if possible, but in no case abandoned until the guilty person is eliminated. Not fire, but the owner of the hand that lights it, is the public's enemy. In his heart, and that of his wife and child and neighbor, of the officer of the law and the judge on the bench, of editor, legislator, and man on the street, there must be the knowledge that his hand has been set against society as surely as that of the pervert, the killer, and the thief.

We have precepts as old as the Commandments against murder and theft. But for protection against those insufficiently influenced, we invoke the law, and that the law may not fail, we add the contempt of decent citizens for those who break it or condone. It may not be otherwise if precepts against fire are to govern human conduct. But it is not so in America, else all but a bare handful of those guilty of setting fires would not go unpunished.

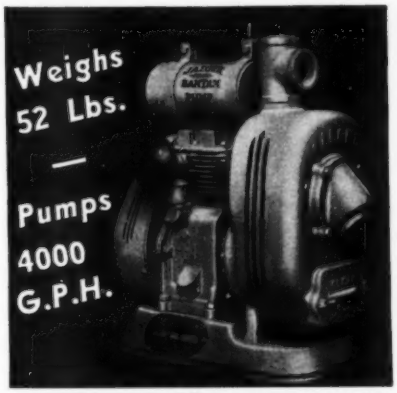
In dealing with this fire evil, I would devote not less than five per cent of every forest protection budget to education against the starting of fire. You need not tell me that $400,000, or this proportion of our average eight million dollar expenditure for fighting forest fires, would not, if skillfully used, cut down the cost by a far greater amount and save tremendous loss besides. It is an indefensible system that leaves preventive education, in a situation such as I have described, to haphazard experiment with funds that can be spared from fire-fighting.

In this educational effort I would not abandon other arguments, but I would center the campaign on personal responsibility. It matters not whether the cause be wilful incendiarism or carelessness with match or cigarette, the results are identical. Moreover that personal responsibility attaches to him who condones as well as he who wilfully acts. It even applies to the legislator whose paring of a needed appropriation forces men, women, and children to face those 114,000 miles of flame.

I would police the woods in a way they have never been policed. I would not leave the law to be taught and enforced by forest firemen, however splendidly chosen and trained for the technique of their own profession, but I would provide men chosen and trained for the profession of law enforcement.

It is an indefensible system that trains thousands of men to chase and fight fires, but virtually none to chase and fight those who build the fires.

(*This article was first published in* AMERICAN FORESTS *for March, 1925. Although here reprinted under its original title of "50,000 Firebrands," all figures relating to the yearly number of fires, fire damage, etc., have—with the consent of the author—been brought up to date.*)



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The American Forest Fire Medal

(*Continued from page* 201)

prevention and protection, was set up to award the medal "for outstanding heroism in fighting forest fires anywhere in the United States, Canada and Mexico." J. P. Kinney, representing The American Forestry Association, was named chairman of the Board. Other members appointed were John D. Guthrie, representing the Society of American Foresters; Tom Gill, representing the Charles Lathrop Pack Forestry Foundation; T. E. Goodyear representing the Association of State Foresters; and John B. Woods, representing the National Lumber Manufacturers Association.

The Foundation was made possible and will be perpetuated by funds contributed by many individuals and organizations—contributions ranging from ten cents to a hundred dollars. It has been officially approved by all federal, state and private agencies concerned with the protection of forests from fire. Active headquarters have been established at 919 Seventeenth Street, Northwest, Washington, D. C.

Urban J. Post

Paul E. Tyrrell

Bert Sullivan

The first awards of the American Forest Fire Medal for Heroism brings back into sharp focus one of the most tragic chapters in recent forest fire history—tragic in that the lives of fifteen fire fighters, mostly members of the federal Forest Service and the Civilian Conservation Corps, were lost. Only courage, sound judgment and able leadership on the part of officers in charge of the fire prevented greater loss of life.

In size and in the amount of timber destroyed, the Blackwater fire was not particularly noteworthy. It was a peculiar combination of circumstances rare in forest fire history that wrote tragedy over this rough country. A well behaved fire of several hundred acres, in the process of being expertly brought under control by veteran forest officers and CCC fire fighters, was struck by hurricane-driven winds that swept in with the suddenness of fate. One crew, in charge of Ranger Alfred G. Clayton, was trapped and struck down by searing flames at a small water hole in a deep ravine. Another, driven to a narrow rock ledge, was bathed with flame as gale-driven winds changed with unbelievable suddenness.

It was on this ledge that the heroic deeds of Ranger Post, Forester Tyrrell and Mr. Sullivan were enacted.

Ranger Post, in charge of this trapped crew of fire fighters, was cited as follows: "Taking into the fire area some forty-five men, for whom he was at all times responsible, he looked over and judged the terrain, as he set the men to work extending the control line. Hardly had the men begun work, when a high and sudden wind began to sweep the fire into the tree tops and flames and smoke from below roared up toward his crew. Post, with quick judgment, took immediate action to save his men. Climbing the steep slopes, urging on the CCC boys, assisted by Tyrrell and Sullivan, he reached the only possible retreat, a small rocky ledge. There surrounded by fire, and assisted by Tyrrell and Sullivan, he kept the men prone on the ground, while flames swept alternately from east and from west over the ledge. Marooned, he held the men there and kept up their morale. In a hazardous location and during a time of extreme danger, for himself and all his men, he exhibited sound judgment, courage, and leadership, and by his heroic acts, saved the lives of forty panic-stricken CCC boys."

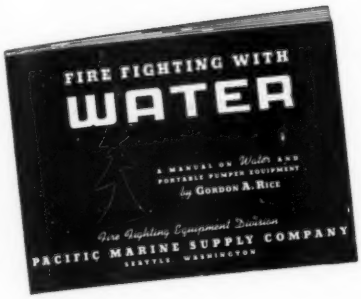
Forester Tyrrell was cited as follows: "Forestry foreman in the Tensleep CCC Camp, and in charge of forty CCC boys, Tyrrell felt keenly his responsibility for them and for their safety. When forced to retreat up the mountain to a place of safety, Tyrrell gave Ranger Post every possible assistance in seeing that no boy was caught by the fire while climbing to the rocky ledge.

"On the ledge he constantly and at great and constant personal risk, exposed himself to flames and smoke in keeping the boys prone, calming, quieting and encouraging them, even throwing himself over the bodies of several boys, shielding them from the flames. In doing so he breathed smoke and flames.

"Courageous, loyal, and self-sacrificing at all times, he helped save the lives of forty boys by his heroic conduct, and in so doing made the supreme sacrifice."

While Mr. Sullivan's medal will not be presented to him until this summer, he will be cited for outstanding heroism in assisting Ranger Post.

So the nation pays well deserved tribute to the heroic guardians of its far flung timberlands—hardy men to whom no sacrifice is too great to check the greatest destroyer of our forest resources. Through the American Forest Fire Foundation their heroic acts will live to become a part of the traditions of American forestry.



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